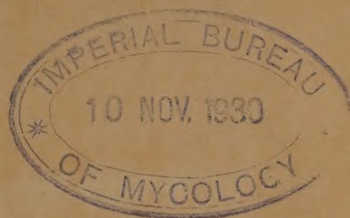


CEYLON.



PART IV.—EDUCATION, SCIENCE, AND ART (D).

Administration Report of the Acting Director of Agriculture for 1929.

(*Dr. W. SMALL, M.B.E.*)

APRIL, 1930.

Ordered by His Excellency the Governor to be Printed, April 3, 1930.

PRINTED AT THE CEYLON GOVERNMENT PRESS, COLOMBO.

To be purchased at the GOVERNMENT RECORD OFFICE, COLOMBO ; price 55 cents.

1930.



PART IV.—EDUCATION, SCIENCE, AND ART (D).

Administration Report of the Acting Director of Agriculture for 1929.

(Dr. W. SMALL, M.B.E.)

APRIL, 1930.

Ordered by His Excellency the Governor to be Printed, April 3, 1930.

PRINTED AT THE CEYLON GOVERNMENT PRESS, COLOMBO.

To be purchased at the GOVERNMENT RECORD OFFICE, COLOMBO ; *price 55 cents.*

1930.

DEPARTMENT OF AGRICULTURE.

REPORT OF THE DIRECTOR OF AGRICULTURE FOR 1929.

PART I.—AGRICULTURE IN CEYLON.

GENERAL.

DURING 1929 weather conditions departed from the normal. Generally speaking, both monsoons were late and light, and a drought which was the severest for many years occurred in the early part of the latter half of the year and did much harm to agriculture. Paddy was short in yield in many districts and areas were kept out of cultivation through scarcity of water. On the whole, prices of agricultural products fell considerably and marked 1929 as an unfavourable year for agriculturists.

Mention ought to be made of the establishment of eight Imperial Bureaux in England, the work of which will be very helpful to local investigators, and of the setting up of a local Committee on Soil Erosion. The latter body consists of representative planters and revenue, forestry, survey, irrigation, and agricultural officials. It began its work soon after its appointment was announced and continued it during the remainder of the year. A Commission was appointed to inquire into the coconut industry and means of relieving its depressed condition.

The writer of this report has continued to act as Director of Agriculture during the year under review. The field staff of the Department of Agriculture was strengthened by the appointment of a fifth Divisional Agricultural Officer with headquarters at Gampaha.

TEA.

During 1929 production in all tea-growing countries increased to such an extent that the amounts of tea exported exceeded the requirements of the market. Shipments of black tea from Ceylon alone showed an increase of more than fifteen and a half million pounds over the figures for the previous year. High-grown teas were in demand during the year, and prices in Colombo actually averaged 3 cents more than 1928 prices, but medium and low-grown teas were less in demand and therefore showed a fall in price. The last-mentioned were sold at and under the cost of production and have thus suffered severely from the state of the market. The average price of all kinds of Ceylon tea in public sales in London showed a drop of 3½d. from the early months of 1929 to the end of the year, while the average price obtained in local sales fell from 85 cents in 1928 to 81 cents in 1929. The fall in prices has led to discussion of ways and means of remedying the state of affairs, and it has been suggested that shipments to Russia should be resumed and that output should be restricted. While it is realized that the basic remedy lies in an increase of consumption and cheapening of the cost of production, a definite scheme of restriction has been approved provisionally by India and Ceylon.

Exports of black tea during 1929 amounted to 250,430,570 lb. and of green tea to 1,157,442 lb. The corresponding figures for 1928 were 234,890,761 lb. and 1,828,628 lb. Quality was well maintained and Ceylon teas more than held their own against teas from other countries. Cultivation, manuring, and manufacture continue to receive careful attention and yields per acre continue to increase. Much interest in the question of soil erosion was aroused by visits of the Committee on Soil Erosion to tea-planting districts and by its discussions with District Planters' Associations. There is little doubt that the importance of the subject is realized and that much attention has been, and is being, given to drainage systems, stone terracing, contour hedge planting, high shade and systems of cultivation designed to improve and conserve the soil, but it is doubtful if it is generally realized that primary measures of soil conservation should consist of protection of the soil by means of the crop and ground cover plants from the beating and denuding action of rain. There is much prejudice against ground covers in tea and in favour of clean weeding which can well be replaced by a spirit of inquiry and experimentation. On the other hand, many tea planters have used a leguminous cover crop and plants which are to be regarded as weeds in the ordinary sense of the word and have to report that not only have the cover plants proved of the greatest value as conservers and improvers of the soil but they have had no ill effects on yields. The practice of green manuring is becoming more prevalent, but it cannot be said that all tea planters make full use of loppings. It has not been fully realized that the incorporation of green material with the soil improves the soil and leads to improved conditions of growth and that it has an important bearing on the subject of soil erosion.

The new regulations relating to the movement of plants affected with shot-hole borer which were mentioned in last year's report have been in force during 1929. They were designed to effect an improvement in the general conditions of cultivation in small tea nurseries, but it is doubtful if they will attain the desired end and it is desirable that their working should be carefully

investigated. The number of permits issued during 1929 was 1,867 and the number of plants moved was 6,195,350. The number of permits refused was 15 for 269,300 plants. The results of two years' working of the regulations affecting Tea Tortrix were reviewed towards the end of the year by the Estate Products Committee of the Board of Agriculture, and it was decided that the regulations should remain in force, a decision that had the approval of the Planters' Association.

It may be said of 1929, as of 1928, that no new diseases of tea have been reported to the Department of Agriculture. The Tea Research Institute was without the services of its Mycologist and Entomologist during the latter half of the year, and the Department of Agriculture was glad to be able to assist the Institute by undertaking its advisory work on tea diseases and pests and by investigating the nettle grubs of tea in Uva. Investigation of the termites of tea was continued by the Assistant Entomologist of the Department of Agriculture, and attention was drawn to the serious nature of the pests, to the known means of prevention of attack, and to the method of treatment of affected bushes. It has been found that *Coptotermes ceylonicus* is becoming more prominent as a pest of tea. The Paris Green treatment of bushes infested with *Calotermes militaris* has been applied with success and its cost has been worked out. Mr. C. T. Symons, the Government Analyst, completed his analyses of leaf and made tea from bushes treated with Paris Green and showed that there was no trace of arsenic in either leaf or tea. No danger from the use of Paris Green need therefore be apprehended.

RUBBER.

The amount of rubber exported in 1929 was 86,766 tons 17 cwt. 3 qr. valued at Rs. 93,317,582. The corresponding figures for 1928 were 62,374 tons and Rs. 80,755,062. Latex amounting to 1,251 gallons and valued at Rs. 2,521 was exported; the 1928 figures were 683 gallons and Rs. 1,559. There was thus an all-round increase in rubber exports. The year cannot be said to have been a good one for rubber growers in spite of the fact that the removal of restriction towards the end of 1928 was not followed by the calamities which were prophesied. Like tea, rubber is suffering from over-production; at the same time, stocks in the United Kingdom at the end of 1929 were only a four months' supply. Consumption of raw rubber in the United States of America, on the Continent, and in Great Britain increased despite the extended use of reclaimed rubber. The average London price for 1929 was 10.283d. but the average price for the month of December was only 7.95d. Colombo prices for ribbed smoked sheet were highest at the end of February and the beginning of March (66-67 cents); they sank to 38.5 cents towards the end of the year. Low prices caused many small holders to stop tapping during 1929.

Attention was drawn to the importance of the question of a higher production per acre, mainly through the pages of *The Tropical Agriculturist*, and it is gratifying to be able to record a largely-increased interest in the subject of budding, seed selection, and rejuvenation of old areas. The large increase of consumption which is desired by growers may come with low prices, and it follows that the costs of production must be lowered and the yield per acre must be raised. The exact acreage under budgrafted rubber in Ceylon is not known, but there is no doubt that it has been increased during 1929. Imports of bud-wood and budded stumps of proved Malayan and Dutch clones have increased largely, and many planters have taken steps to find their highest-yielding trees and to keep records of yields with a view to selecting mother trees for testing. It was realized that critical a review of the position of budgrafting in the East was desirable and arrangements were made for a tour of rubber areas in the East by Mr. L. Lord, Economic Botanist of the Department of Agriculture, between the months of March and June. Mr. Lord brought back much useful and up-to-date information. His report, the rubber part of which was published separately in *The Tropical Agriculturist* of October, 1929, and the illustrated lectures he was enabled to give to the Low-country Products Association and to District Planters' Associations brought the question of rubber budding and seed selection prominently before the planting community and aroused a new interest. It was also realized that certain modifications in the budding work of the Department of Agriculture were desirable and that it was necessary to provide guidance to rubber planters concerning the selection and testing of mother trees on estates and on the experimental grounds of the Department of Agriculture and the Rubber Research Scheme. A committee composed of representatives of rubber planters, the Department of Agriculture, and the Rubber Research Scheme was set up and its recommendations were approved by the Estate Products Committee of the Board of Agriculture and the Executive Committee of the Rubber Research Scheme and were published in October as Leaflet No. 58. The committee concerned itself with the testing of clones and other work to be done on the Iriyagama Division of the Experiment Station, Peradeniya, with the policy to be adopted in testing clones on estates, with the procedure required in the selection of mother trees and the standard of yield of prospective mother trees, with the question of testing mother trees affected by brown bast and bark rot, with the question of seed-garden work, with the recording of the seed and leaf characters of local clones, and with the question of the supply of bud-wood and selected seed to small-holders.

A small area of budded rubber on the Experiment Station, Peradeniya, came into tapping during 1929. The mother trees from which the budgrafts were derived were not remarkable for high yield, but it is likely that the yields of the budded plants will exceed those of mixed seedlings. A rejuvenation experiment was begun at Peradeniya. It is an attempt to find out the most economical method of tapping to death as the first stage in rejuvenation, and it is designed to lead on to felling, stumping, manuring and the planting of cover crops, measures for soil conservation, and the final planting of budded stumps. Rejuvenation has been the subject of inquiry by estate authorities and attention has been drawn to the necessity for covering costs as far as possible by heavy tapping of the old rubber before removal.

Examination of the results of the old manurial experiments at Peradeniya showed that there was valid evidence of increase of yield through the use of nitrogenous fertilisers, and, as the matter is of great interest, a new manurial experiment has been arranged and commenced.

On the Iriyagama Division of the Experiment Station, Peradeniya, an area devoted to budding work with the aid of money from the Rubber Restriction Fund, much progress has been made. Fifty acres are now terraced, covered or planted with cover crops, and planted in part. The plan of work was revised and brought up to date in the light of the latest information from the East. Arrangements have been made to test buddings of local mother trees with Henaratgoda No. 2 buddings as a control, to test budgrafts with seedlings, and to test imported clones against Henaratgoda No. 2 clone and local seedlings. Border rows of seedlings have been arranged, and the results of the tests will be capable of statistical examination. Tests of the influence of stock on scion have also been arranged. The making of paths and stone steps, extraction of stumps, and labelling of plants have been attended to. Further yields of Henaratgoda trees were published in *The Tropical Agriculturist* of October. Many of the yields are good but only a few are outstanding. Fifteen Henaratgoda trees have been chosen to be tested at Iriyagama.

It was intimated during the year that the land at Paspolakande, which had been chosen for rubber research work to be financed from the Rubber Restriction Fund, was not available and steps were taken to acquire other land. An area of over two hundred acres has been reserved in the Matugama district, and it is hoped to make a beginning with its development in 1930. The matter of obtaining small plots of land for rubber seed-garden work was taken up during 1929, but inquiries from estates and estate agencies showed that great difficulty would be experienced in obtaining suitable areas under estate auspices. Recourse was therefore had to other means of obtaining land, and it is a pleasure to record the helpfulness of the Conservator of Forests in the matter. It is hoped to set up the required seed-gardens in forest areas, and this question will also receive attention in 1930. Efforts are also being made to show whether budded rubber can be grown in the drier districts of Ceylon. It is realized that the work to be done in seed-gardens and on the Matugama area referred to will require expert guidance and attention, and it is hoped that the Rubber Research bill which has been before the Legislative Council during the year will pass into law and so enable an enlarged Rubber Research Scheme to provide the workers and the supervision required. Besides an increase in the scope of work devoted to the testing of local mother trees, extended investigation is urgently required into the manurial requirements of the rubber tree, the rejuvenation of old areas, density of planting, methods of selective thinning, cover crops, tapping systems, and the influence of stock on scion.

It was noted that in 1929 *Oidium* leaf disease was less prevalent than usual in the Kandy District. The fungus, however, is very prevalent in the drier rubber districts and much attention has been given to it by the Mycologist of the Rubber Research Scheme. Experiments to test the value of nitrogenous manuring as a means of minimizing the effects of *Oidium* and potash manuring as a means of increasing the resistance of the leaf to infection are in hand, and the value of spraying with a lime-sulphur preparation as a means of direct control is under test. A power machine for dusting large areas with sulphur in a short time is also under trial. Attention has been given to a *Phytophthora* disease of bud shoots and to the control of bark rot, while the question of the necessity for disinfection of budwood and stumps before import is under investigation. Poisoning experiments with the Kalutara snail gave disappointing results but are being continued. The attention of the Acting Mycologist of the Department of Agriculture was given to diseases of bud shoots caused by slugs and *Rhizoctonia Solani*, and the Assistant Entomologist recorded two species of *Calotermes* attacking rubber. The latter records are new and attention should be given to the pest. The scraping and isolation treatment of brown bast has been continued with success.

The Chemist of the Rubber Research Scheme continued his work on the production of a sheet of standard quality and appearance with a low consumption of fuel. The steam-heated smokehouse was brought into operation and attention was given to the question of the air movement needed to dry rubber with the use of a minimum amount of fuel. It was shown that discolouration of crepe rubber was due to the action of light and not primarily to the use of paranitrophenol and also that the iron contained in factory water was not responsible for discolouring crepe. A piece of work of practical value showed the sources of moulds on rubber and how they could be prevented. Numerous samples of sheet rubber were despatched to the Imperial Institute as material for investigation of the properties of rubber prepared under varying conditions.

Much progress has been made on Nivitigalakele Experiment Station which is under the charge of the Physiological Botanist of the Scheme. The cover of green manure and indigenous plants has been improved, stumping has been done, and the programme of cultivation and manuring has been carried out. The budding work has been pushed on as fast as possible. Mr. H. W. Roy Bertrand was appointed Visiting Agent of the station, a step that was welcomed by the officer in charge and approved by the Executive and Technical Committees of the Scheme. The Physiological Botanist has undertaken the field inspection of a number of local mother trees and has rendered valuable help to estate authorities who are confronted with the difficulties associated with the selection of mother trees and the rejuvenation of old areas. Emphasis has been laid on the advantages of drawing the maximum amount of latex from old trees before cutting out and a heavy tapping experiment is in progress. The question of the possibility of utilizing to form synthetic farmyard manure at least part of the timber which will be available when old areas are being cleared has not been overlooked, and a small experiment with wood chips is in progress. The results of the Arapolakande manuring experiment were worked up. The yield of the field increased as a whole, but it was found that, owing to the short period of the experiment, the cultivation of land previously unforked had had a large influence on the results. A new manurial experiment was drawn up and approved by the Technical Committee.

The work of the London staff of the Rubber Research Scheme on the causes of the variation of the plasticity of plantation rubber was continued. It is known that there would be a large demand for and increased uses of first grade plantation rubber if the rubber was more uniform than

it is, and efforts are therefore required to increase the uniformity of the estate product. Investigation has been directed towards finding out the cause or causes of abnormal properties in rubber and towards showing whether attention to methods of manufacture will lead to greater uniformity. The causes of variability in plasticity of first grade rubber are thus under intensive study. It has already been shown that differences in methods of preparation do not account for the variation encountered by manufacturers and investigation has been extended to include a study of the effects of storage on variation, a point that is of great importance. Mr. G. Martin, who is in charge of the London work, spent three months in Ceylon during 1929 and was enabled to study local factory methods and to arrange for a continuance of close co-operation between himself and the Chemist of the Scheme in Ceylon.

The number of subscribers to the Rubber Research Scheme at the end of 1929 was 214, a decrease of eight over the 1928 figure. Local subscriptions amounted to Rs. 35,324. Mr. J. Mitchell, who had been Organizing Secretary of the Scheme since 1922, resigned his appointment and left for England in October.

COCONUTS.

The following are the figures of exports for 1929:—

		Quantities.		Value. Rs.
Coconuts, fresh	.. ..	20,821,284 nuts	..	1,281,910
Copra	.. ..	2,042,488 cwt.	..	26,315,987
Desiccated coconut	.. ..	690,469 cwt.	..	11,875,780
Oil	.. ..	878,523 cwt.	..	18,024,359
Poonac	.. ..	333,424 cwt.	..	2,114,898
Fibre, bristles	.. ..	199,923 cwt.	..	1,713,667
Fibre, mattress	.. ..	395,468 cwt.	..	812,763
Coir yarn	.. ..	100,635 cwt.	..	1,837,568

The corresponding figures for 1928 were—

		Quantities.		Value. Rs.
Coconuts, fresh	.. ..	18,016,191 nuts	..	1,424,287
Copra	.. ..	1,976,656 cwt.	..	31,801,635
Desiccated coconut	.. ..	786,703 cwt.	..	19,840,117
Oil	.. ..	779,112 cwt.	..	19,265,529
Poonac	.. ..	291,514 cwt.	..	2,018,407
Fibre, bristles	.. ..	182,241 cwt.	..	1,527,879
Fibre, mattress	.. ..	387,036 cwt.	..	1,051,933
Coir yarn	.. ..	92,162 cwt.	..	1,635,827

The figures for 1929 show that in the case of fresh coconuts and copra an increase of exports was accompanied by a decrease in the value of the products. Desiccated coconut exports compare unfavourably with those of 1928 in both amount and value, while the figures for coconut oil and poonac show increases over 1928 in both quantities exported and their values. The price of copra fell in 1926, recovered to a slight extent in 1927, and fell again in 1928. The fall was continued in 1929 although there was a recovery in June. The copra market was affected by the large and cheap supplies of grain which were available and by the consequent fall in the demand for oilcake for the feeding of cattle. In addition, it will be noted that present-day copra production is almost double that of pre-war years. The high prices obtained by growers during the years immediately following the war led to an extension of coconut planting which is responsible for the present over-production. Further, new areas have yet to come into bearing, and it follows that the remedy for the present position lies in an increase in the demand for copra through the finding of new markets and new uses for it and through the cheapening of production.

There is also the question of competing products. The production of whale oil, ground-nuts, and vegetable oils in general has increased, and soya beans has been used by the makers of margarine in increasing quantities. The soya bean is exported from China and Korea, and, whereas the exports of China averaged 685,000 tons over the years 1909-1913, they rose to 1,732,000 tons in 1927. The soya bean is therefore a serious competitor in the vegetable oil market. It is the case, however, that copra is in greater demand by the makers of margarine than are oil seeds. Copra prices may be affected by the buying policy of the margarine combine which was established in 1929. When supplies are large, the combined buyers may be able to depress the market, and the remedy would seem to lie in co-operative marketing by the sellers.

The above points must be considered, but the importance of cheaper production must not be overlooked. Coconut cultivation is capable of all-round improvement through the adoption of manuring and green-manuring programmes and of methods of the conservation of soil moisture, and the progressive policy of removing low-yielding palms and replacing them with plants derived from selected high-yielding palms may be urged on the industry. Attention should also be given to the process of manufacture; a reliable product is always in greater demand than a variable product. It is apparent that interesting and profitable lines of work await the attention of the Coconut Research Scheme, and it is hoped that the scheme will play in due course a large part in the improvement of the industry.

A special effort was made by the Agricultural Chemist to bring before coconut planters the advantages of green manuring. Lectures were given at various points and Leaflet No. 57 was issued.

The results of the past few years of the Chilaw manuring trials were critically examined. It was found that there was a significant positive correlation between the average annual yield of copra per palm and the total rainfall of the previous year. Sandy loams gave a larger yield

than light gravelly soils and yields were not maintained by cultivation alone. Fish manure gave a significant increase of yield whereas steamed bone meal only maintained yields. The value of potash, especially after sulphate of ammonia, was indicated, and a significant increase of yield was obtained from the use of a mineral mixture and from an organic mixture and lime. The results of the experiments were published in *The Tropical Agriculturist* and were also discussed by the Estate Products Committee of the Board of Agriculture. A scheme for placing the experiments on a new and up-to-date basis was submitted, but it was decided that the trials should not be continued at once and that the trial area should be given a period of recuperative manuring.

Coconut diseases have not been more prominent than in previous years. Stem bleeding and bud rot occurred, while black beetle, red weevil, and coconut caterpillar were in evidence here and there. Gray blight of leaves was perhaps the commonest trouble in 1929, but it can be controlled by improvement of growth conditions. A new insect pest of coconut was recorded in the Chilaw District, *Coptotermes ceylonicus* having attacked living stems.

Much useful work in the laying of the foundations of the Coconut Research Scheme was accomplished by the Board of Management. Steps were taken to obtain a Director of Research and to acquire an estate on which a central research station can be established. A large number of estates were offered to the Scheme and several were carefully inspected by a Sub-Committee. A choice has been made, and it is hoped that the negotiations now in progress will result in the acquisition of an area of 200 acres in the Negombo District.

PADDY.

There is no doubt that the interest of the village cultivator in the pure line paddy work of the Department of Agriculture is increasing from year to year. The work was pursued at the central selection stations at Peradeniya, Labuduwa, Wariyapola, and Anuradhapura and on the twenty-three smaller testing stations of the department. Progress was retarded by lack of water at Wariyapola and Anuradhapura, but promising selections made at the central stations have been placed in the hands of the Divisional Agricultural Officers for testing in the paddy seed stations. The initial selection work is attended by many difficulties, chief of which is the variability of conditions from district to district and even between districts which are close together. It is also apparent that selections which do well under the cultural conditions of a central selection station cannot be guaranteed to do equally well under the poor conditions of the fields of the village cultivators. This fact led to a discussion of the problem during the year and a decision to the effect that, as the aim was to improve paddy cultivation, selection should be made under good soil conditions. It follows that it is necessary to test selections carefully in the districts before their distribution to paddy cultivators, a point that is appreciated by field officers. New selections made in 1929 numbered 415. During the year 332 were discarded and at the end of the year 626 were under trial.

The value of pedigree seed as a means of increasing yield is enhanced by the cheapness of the method, but at the same time it is realized that much can be done by other methods. Useful results were obtained from manurial experiments and efforts were made to improve cultural methods by field demonstrations and extension work in the divisions. The many difficulties, however, which confront paddy cultivation are only partially known and are insufficiently realized. With the object of obtaining a full and authentic account of the difficulties and of bringing them to full notice the Food Products Committee of the Board of Agriculture appointed small committees in all parts of the Island and entrusted them with an inquiry into the conditions of paddy cultivation. The committees have been at work during the year but all have not yet reported. When the reports have been summarized and discussed by the Food Products Committee, it is intended that they shall be put before the Board of Agriculture during the Agricultural Conference which it is hoped to hold in 1930. A full discussion of the reports will be of great value and should lead to recommendations for effective action.

The Economic Botanist studied paddy cultivation in Malaya, Java, and Indo-China during a visit to the East in the months of March to June. His report on paddy was published in Sessional Paper XXXVII. of 1929, and also separately in *The Tropical Agriculturist*. The lines of work for the improvement of paddy cultivation in Ceylon are similar to those pursued in the countries visited by the Economic Botanist, but it was borne in on him that the difficulties attending the work in Ceylon are greater than those of other countries. The local difficulties are emphasized and greatly increased by the smallness of the areas of paddy and by the changes in climatic conditions from valley to valley, and it follows that local progress will be slower than that of more fortunate regions.

CACAO.

The amount of cacao exported in 1929 was 82,679 cwt. 2 qr. 8 lb. of a value of Rs. 4,236,136. The figures for 1928 were 73,618 cwt. and Rs. 2,818,361. The drought of July, August, and September was the worst for many years and it led to loss of crop and affected the size and quality of the bean. Prices of No. 1 quality averaged Rs. 50-55 and of good blacks Rs. 10-16 and were less than those of the previous year.

A study of the collection of cacao varieties (nine in number) on the Experiment Station, Peradeniya, has shown that the plants do not bear pods of the type the parent plants are said to represent, and efforts are therefore being made to propagate the plants vegetatively by budding. Budding has been attended by greater success than gootee layering.

CARDAMOMS.

Exports of cardamoms amounted to 2,849 cwt. valued at Rs. 647,094, a decrease of both quantity and value in comparison with the previous year.

CITRONELLA.

Exports of citronella oil in 1929 were 1,183,239 lb. and showed a decrease of over 16,000 lb. from 1928. The value of the exports of 1929 was Rs. 1,226,452, an increase over the value of the larger amount of oil exported in 1928. The Agricultural Chemist has shown that citronella oil should be purchased on the basis of geraniol content as well as on the results of Schimmel's test.

CINNAMON.

Cinnamon quills showed a larger export in 1929 than in 1928, the respective figures being 37,059 cwt. and 34,699 cwt., but the value fell from Rs. 4,762,121 in 1928 to Rs. 3,566,735 in 1929. Chips to the amount of 11,158 cwt. and value of Rs. 217,705 were exported. The cinnamon market was less favourable in 1929 than in 1928.

FIBRES.

Exports of sisal fibre amounted to 114 cwt. and were valued at Rs. 1,600. The amount of graded fibre produced on the Experiment Station, Anuradhapura, was 5½ tons which was sold in Colombo at Rs. 300 per ton first quality. Sisal cultivation at Rambewa (North-Central Province) has been continued, but efforts to start a similar scheme in the Southern Province have failed owing to the apathy of the cultivators.

Kapok to the value of Rs. 562,472 was exported, the amount being 8,636 cwt. The production of kapok showed a large increase over the previous year. A report from the Imperial Institute showed that local kapok was improving in quality and pack. Ceylon kapok can find a ready market so long as preparation of the fibre is done with care. There is little doubt that there is room for improvement in the preparation and packing and need for the export of standard grades of guaranteed quality.

Locally grown cotton was bought as usual by the officers of the department on behalf of the Spinning and Weaving Company. The price paid was Rs. 14.50 per cwt. at Middeniya and Liyangantota and Rs. 15.50 at Bata-ata, Ambalantota, and Hambantota. No Government subsidy was paid. In the Southern Province the area under cotton was extended and the crop was almost double that of 1928. Yields were low; the weather was unsuitable and the prevalence of fever among the growers led to inability to attend to weeds and cultivation and to late maturing of the lint. A large proportion of the crop (65 per cent.) was got from the second picking. Samples of local cotton were sent to the Director of the Technological Laboratory of the Indian Central Cotton Committee and his report showed that a fair value had been given for the first quality Cambodia of which the crop largely consists.

It is desirable that work should be continued with the local Cambodia strain. Improved Bancroft and Zululand Hybrid have shown no advantage over Cambodia, and Durango American has given poorer results than the other strains. Indian varieties were imported during 1929 and are under trial at Tissamaharama. They will be judged on yield for it is not expected that their lint will be of the same value as that of Cambodia. The report from the Indian Central Cotton Committee also showed that no damage was done to lint by the saw gin installed at Ambalantota, and it is desirable to consider the advisability of ginning a certain amount of the Southern Province crop at Ambalantota in order to avoid the expense of sending the seed cotton to Colombo and bringing back the seed to the Southern Province. It is also desirable to prevent the grower from picking immature cotton. The single purchase which was tried in 1929 for the first time has much to commend it.

PAPAIN.

The figures of exports and value of papain for the years 1927, 1928, and 1929 are of interest. They show a large increase in exports and value followed by a small increase in exports and a fall in value which is not encouraging to the producers and points to a state of over-production:—

			Exports. lb.		Value. Rs.
1927	..	..	83,416	..	670,974
1928	..	..	125,684	..	922,529
1929	..	..	128,463	..	642,318

ARECANUTS.

Exports of arecanuts amounted to 144,169 cwt. of a value of Rs. 2,699,095. The export trade in arecanuts is thus of considerable dimensions and it appears to be expanding from year to year.

TOBACCO.

The exports of tobacco during 1929 were as follows:—

Manufactured, 12,373 lb. valued at Rs. 87,468.

Unmanufactured, 3,193,567 lb. valued at Rs. 572,202.

These figures show a considerable increase over the figures for 1928, the amount of unmanufactured tobacco exported being almost double that of the previous year, and they point to the taking up of the crop on a large scale by cultivators. The Department of Agriculture continued its work of assisting and advising cultivators in the growth and preparation of White Burley tobacco and exported 25,312 lb. which realized an average price in London of 1s. 3d. Trouble has been experienced with weevils in the tobacco sent to England, but it is doubtful if infection takes place in Ceylon.

PART II.—WORK OF THE DEPARTMENT OF AGRICULTURE.

GREEN MANURES AND COVER CROPS.

The Agricultural Chemist studied the relation of green manuring to soil moisture and showed that loppings of tree green manures should not be turned into the soil immediately prior to or during dry weather but preferably should be dug in towards the end of the rains. Bush manures should be cut at the same time. The subject of the composition and decomposability of green manures and their variations with the age of the green manure plants was also studied, and it was found that nitrogen was available in maximum quantity at the time of flowering and that the lignin: pentosan ratio increased with the age of the plants. The Chemist also showed that the content of organic matter and nitrogen of the soil of the plots under *Indigofera endecaphylla* increased and that the cover plant prevented loss of soil, especially of the finer fraction.

The Manager of the Experiment Station, Peradeniya, has reported successful results with *Indigofera endecaphylla* as a cover for tea. Experimental work shows an increase in the yield of green leaf in thirteen out of fifteen plots under *Indigofera* when compared with the yields of a period without *Indigofera*, and it is reported that strips of tea under *Indigofera* are more vigorous than similar strips with bare soil. *Centrosema pubescens* has continued to do well on the Iriyagama Division and to provide an excellent cover for terraces and intermediate slopes. Satisfactory results have also been got from a mixture of *Centrosema* and *Calopogonium mucunoides*. It is necessary to take steps to control these cover plants and to remove weeds in the early stages of their growth. *Dunbaria Heynei* has continued to do well at Kegalla Experiment Station and it has been introduced on the Experiment Station, Peradeniya, where other indigenous plants are on trial. The value of seed and cuttings of green manures sold by the Experiment Station, Peradeniya, was less in 1929 than in 1928, but the Central Seed Store sold over five tons of green manure seed during the year under record. Lupins were introduced from Australia. The results have not promised well but the plant has not yet had a full trial.

It is worthy of special note that there is no evidence of *Indigofera* being harmful to tea and that investigation of the difficulties of establishing cover plants on old land, especially in rubber, is urgently required.

SOIL EROSION.

The subject matter of the preceding section leads naturally to the subject of soil erosion for there is an intimate connection between the use of cover plants and the amelioration of soil conditions by green manuring on the one hand and the prevention and control of soil erosion on the other. Visits of the Committee on Soil Erosion to the planting districts and discussions with representative agriculturists have stimulated interest in the subject and have enabled the members of the Committee to study the attitude of agriculturists towards the question of erosion and to see and appreciate the large amount of attention that has been given to measures of soil conservation on estates. Mention may be made of the papers of Messrs. du Pré Moore, Holland, Wilmot Perera, Denham Till, and Marsh-Smith which have been published during 1929 in *The Tropical Agriculturist*, of the efforts of Mr. Felsingier to make known the advantages of the lock-and-step system of drainage, and of Mr. Dias' advocacy of contour platform planting and cover crops. It can be said that on the whole it is realized that measures must be taken to prevent the valuable surface soil from being carried down the slopes and into the streams and rivers of Ceylon, but it is doubtful if it is as fully realized that the soil should be protected from the direct erosive action of water falling upon it, that the maximum absorption of water by the land should be assured, that the removal of surplus water should be carefully controlled and that every possible means should be employed to trap eroded soil and so ensure its being returned to the land. In other words, much of the work that has been done is of importance from the point of view of the control of erosion but the primary aspect of the subject, the necessity for soil cover which will go a long way towards preventing erosion by holding up the run-off of surface water and by ensuring maximum absorption, has been neglected. Much prejudice against the use of cover crops still exists, but, on the other hand, many planters are convinced of the evils of clean weeding and of the advantages of a soil cover of leguminous plants or of plants which are weeds in the ordinary sense of the word, and it should be noted that no evidence has been produced to show that cover plants have adverse effects in yields or on the general health of the crop. On the contrary, there is a steadily accumulating body of evidence which shows that cover plants are distinctly beneficial. It is also clear that the problem of erosion can be and has been solved in various ways, and it is hoped that the report of the Committee on Soil Erosion will place the problem as a whole before the agriculturists of the Island and will indicate clearly the means of soil conservation that should be adopted and the principles underlying the recommendations.

In the soil erosion experiments on the Experiment Station, Peradeniya, the treatments have been shown by the results published during the year to have exercised definite effects. There is definite proof of the usefulness of hedge plants, of *Indigofera endecaphylla* as a soil cover and of silt pits in drains, and there is also reliable evidence to the effect that envelope forking increases erosion. The latter result should not be interpreted as a condemnation of envelope forking; it points rather to the necessity for adopting other means of soil conservation when envelope forking is done on a steep slope.

It may be added that determinations of the amount of silt carried by the waters of the Mahaweli-ganga at Peradeniya, which have been made by the Agricultural Chemist, show that the silt varies from 69 to 371 parts per 1,000,000 by weight and that an average depth of four feet of water carries 1 to 4 lb. of silt per 1,000 gallons of water or 15 to 75 lb. per second. It is also clear that the Mahaweli-ganga carries most silt after heavy rain has fallen in the catchment area of the river, a fact which justifies the assertion that the soil of Ceylon is being carried out to sea.

ECONOMIC BOTANY.

Paddy.—The results of the 1929 maha and yala field trials, details of which are given in the reports of the Divisional Agricultural Officers, show that the under-mentioned selections are promising and worthy of further test:—

<i>Maha.</i>				
Paddy Seed Station.	Variety selected from	Selection.		Percentage over control.
Bandaragama ..	Honderawala ..	25035 ..		56
	Do. ..	25025 ..		48
	Do. ..	25065 ..		21
Belunmahara ..	Podiwi ..	a-8 ..		21
	Kurulutuduwi ..	b-13 ..		15
Borala ..	Kaharamana ..	27007 ..		54
	Do. ..	27024 ..		43
Illupadichchenai ..	Perillavel ..	26015 ..		57
	Do. ..	26014 ..		30
	Morungakkai ..	26029 ..		32
Kanniyai ..	Oddavalai ..	7 EPY 4 ..		50
	Chellakadai ..	24509 ..		33
Kurunegala ..	Sudumawi ..	1-17 ..		18
Matugama ..	Suduhandiram ..	27515 ..		67
	Do. ..	27534 ..		59
	Do. ..	27522 ..		54
	Ratu Madael ..	27553 ..		48
	Do. ..	27525 ..		45
Tissamaharama ..	Do. ..	27575 ..		35
	Illankalayan ..	1b-16 ..		12
<i>Yala.</i>				
Paddy Seed Station.	Variety selected from	Selection.		Percentage over control.
Bandaragama ..	Dewaredderi ..	26081 ..		14
Batapola ..	Madael ..	27657 ..		21
	Do. ..	27658 ..		18
	Do. ..	27668 ..		15
	Dewaredderi ..	28652 ..		61
	Do. ..	28653 ..		61
	Do. ..	28660 ..		61
	Do. ..	28664 ..		61
	Do. ..	28655 ..		53
Borala ..	Kaharamana ..	27007 ..		35
	Do. ..	27024 ..		20
Matugama ..	Suduhandiram ..	27522 ..		54
	Do. ..	27534 ..		21
Paranthan ..	Ratu Madael ..	27575 ..		37
	Karuppu chinati ..	Ho. 33 ..		32
	Hinati ..	Hn. 15 ..		25
	Sudu heenati ..	Hf. 9 ..		21
Sengapaddai ..	Vellai perunel ..	26714 ..		10
Tamblegam ..	Chinati ..	2458/13 ..		17
	Do. ..	2458/8 ..		13
	Pachiperumal ..	2462/17 ..		—
	Do. ..	2462/11 ..		—
Uyilankulam ..	Kaluhinati ..	Hk. 13 ..		80
	Karuppu chinati ..	Ho. 6 ..		60
	Morungan ..	Mb. 14 ..		20

It has already been mentioned that the pure line work of the Department is attracting an increasing amount of attention from the villager. Certain problems which have arisen in the course of the work were discussed by the officers concerned with them, and decisions on future policy in, for example, selection work and the conditions of laying down trials of pure line paddy in villagers' fields were made for guidance. While a rapid extension of the use of pure line seed has not taken place and is indeed not feasible at the moment, it falls to be recorded that solid progress has been made both in the internal work of the Department and the extension work among cultivators. The division of Economic Botany distributed during yala 1929 and maha 1929-30 227½ bushels of pedigree seed.

Manuring of paddy is an important means of increasing production and attention has been devoted to both green and artificial manures. It was shown by the Economic Botanist that the use of green manures in paddy cultivation can always be recommended and that a 100 lb. dressing of 20:20 ammophos or of equivalent amounts of nitrogen and phosphoric acid in the form of 75 lb. sulphate of ammonia and superphosphate (104 lb. of 18 per cent super.) gives a profit. This work is of great practical value. Manurial trials have been extended to the central stations at Wariyapola and Anuradhapura and investigations of green manuring are also being extended. Work has been continued on the technique of paddy field experimentation and hybridizing of local and foreign paddies. It was shown that a short-aged paddy gives a statistically significant increase of yield after transplanting but not enough to compensate for the extra labour. The transplanting will pay, however, when it is done on communal lines. Special attention was given to the maintenance of the purity of main lines, and a uniformity trial was laid down at Anuradhapura to determine the most efficient size of field plot for local conditions. A pot experiment showed that continuous submergence of paddy gave better results than periodic drying and led to further and more elaborate experiments, the results of which will be published in due course.

A study of the effect of periodical sowing of paddy is in progress, and, following on a recommendation of the Food Products Committee of the Board of Agriculture, areas have been set apart at Peradeniya and Anuradhapura for cultivation on a commercial basis. Records of cost are being kept and they will be published in due course.

The Agricultural Chemist also worked on the green manuring of paddy land and showed that green manures were of direct manurial value and should be applied late rather than early. They maintained and even increased the nitrogen content of paddy soil. Owing to losses of nitrogen through leaching and denitrification and the formation of nitrites harmful to seedlings nitrates should not be used.

Vegetables.—Selection work with bandakka (*Hibiscus esculentus*), cowpea, and kurakkan (*Eleusine coracana*) has been continued and seed has been distributed for trial.

CHEMICAL WORK.

Certain lines of work done by the Agricultural Chemist have already been referred to under other headings. In addition, the Chemist continued his leaching and drainage trials. The results confirmed the conclusions drawn from the 1927-28 trials with special reference to the relationship between drainage and rainfall. The losses of fertilizing constituents from cropped pots were less than the losses from uncropped pots and the pots cropped in 1928. The results thus show that bare soil leads to a greater loss of soluble constituents and that cropping minimizes loss. The losses of nitrate nitrogen were greatest in amount and were followed by losses of lime, magnesia, chlorine, and potash in the order given. No loss of phosphoric acid was detected and the quantities of ammonium nitrogen lost were inappreciable.

In a study of the carbon and nitrogen content and reaction of soils under green manuring losses of carbon and nitrogen were shown to be smaller in amount with green manuring than without, and it was concluded that the carbon and nitrogen content of soil could be maintained by green manuring. A similar conclusion was arrived at as a result of a study of the conditions in soil which had been under *Indigofera endecaphylla* for four years.

Animal ash from the Colombo municipal incinerator and coconut oil residue cake were examined and shown to be valuable fertilizing materials. It was also shown that use could be made of coconut coir dust and husk. The former can be dug with advantage into sandy soils along with green and artificial manures, and it can also be used as a surface mulch for light soils in dry districts and as an improver of heavy clay soils. The latter can be converted into readily available artificial farmyard manure in six to eight months.

Investigation of the losses of soil fertility brought about by chena cultivation and of the possibility of minimizing the losses by a system of rotation of crops has been begun. In the course of the work records of costs and returns from the sale of crops will be kept.

BOTANICAL WORK.

The reports of the Acting Systematic Botanist, the Curators of Peradeniya and Hakgala Gardens, and the Assistant Curator of Henaratgoda Gardens are appended. Systematic work was held up during the year by the absence on leave of the Systematic Botanist (Mr. A. H. G. Alston). Much improvement was effected to the paths and the arboretum of the Royal Botanic Gardens. Cinchona plants (842) were distributed from Hakgala Gardens to estates for trial in different districts of the Island.

DISEASES AND PESTS.

It has already been indicated that no new diseases of the major crops of the Island have been encountered during the year under review. The Mycological Division was enabled to devote attention to the diseases of minor crops and of village gardens, with particular reference to green manures, plantain, jak, betel, tobacco, and tomato. Details of the work done on these host plants will be found in the separate report on plant diseases. Work on the problem of the causation of root disease has been continued. Mr. Park pursued his investigation of root mycorrhiza, a line of work which may yield results of great significance, and Mr. Haigh completed a study of the morphology of *Rhizoctonia bataticola* with special reference to the strains of the fungus and the connection between their sclerotia and the pycnidial form *Macrophomina Phaseoli*. Mr. Bertus continued his work on the viability of the sclerotia of fungi associated with diseases of paddy (*Rhizoctonia Solani* and *Sclerotium Oryzae*). Combined work of the Mycological and Entomological Divisions has shed much light on the causation of bunchy top of plantains in Ceylon and has shown that the disease may be transmitted by *Pentalonia nigronervosa*, the aphid which has been proved to cause bunchy top in Australia. The plants which were successfully infected in experiment were examined for root fungi and eelworms, and it was found that bunchy top symptoms could be produced by the aphid in the absence of fungus or eelworm root infection. There remains, however, the possibility that bunchy top symptoms can be produced by root infection in the absence of the aphid and a further line of work is thus indicated.

The Entomological Division did not report any marked outbreaks of pests during 1929 and the absence of caterpillar pests during the period following the north-east monsoon was noted. Work on Ceylon termites was continued and new records of species of termites on low-country tea, on living *Hevea*, coconut palm, mango, rambutan, *Ficus*, jak, guava, dadap, *Cassia*, *Spondias*, *Cupressus*, *Poinciana*, and other plants were made. The Paris Green treatment of infested tea bushes was carried out with success. Important facts relating to the life histories of termites were obtained, and promising tests against soil-inhabiting species were made with petrol. Bulletin No. 85 which discusses the subject of termites in buildings and gives suggestions for their exclusion has aroused so much interest in the subject that a reprint has had to be ordered.

Nettle grub work in Uva showed that successful spraying could be done with soft soap and *Clensel* and that it was probable that a braconid wasp parasite played a large part in natural control of the pest. Investigation was devoted to the parasites of the coconut caterpillar (*Nephantis serinopa*) in the Eastern Province, and it was found that the percentage of parasitism was too small to bring about the natural control of the caterpillar that takes place in the western districts.

An inquiry into the conditions leading to paddy bug attack was made with the help of the field officers of the Department and useful facts which should lead to experimental work were brought to light. An inspection of the destruction of prickly pear by *Dactylopius tomentosus* in the Jaffna, Mannar, and Trincomalee Districts showed that the introduction of the insect into these areas had been attended with success.

The reports of the Plant Pest Inspectors in so far as they refer to the prevalence of diseases and pests are printed in the separate reports on plant diseases and insect pests.

WATER HYACINTH.

The Plant Pest Inspector of the North-Western Division (Mr. C. N. E. J. de Mel) reports as follows:—

The eradication of water hyacinth has engaged most of the time and energies of the North-Western Division during 1929, nearly two-thirds of 595 days' circuit being spent on this work. Eight large tanks, two oyas, and numerous small infestations were cleared at public expense at a total cost of Rs. 4,185 (October 1928-October 1929). Eight tanks, two of which cost Rs. 800, and several smaller areas were cleared by contributions from or by the labour of field owners. Wennoru-wewa, Kurunegala, was cleared by the Irrigation Department at a cost of nearly Rs. 3,000. In the Colombo District, the system of canals in North Colombo and several minor infestations were cleared. All known infestations within the North-Western Province have now been cleared and have been handed over to the field owners to be maintained free in the future.

The Acting Plant Pest Inspector of the Southern Division (Mr. W. R. C. Paul) reports as follows:—

Considerable improvement in the water hyacinth position in the Southern Division has taken place during the year. The major infestations with the exception of the gigantic Namayala-wila swamp in the Hambantota District have been taken in hand and there now remains the maintenance of a strict vigilance over all the cleared areas and the carrying out of periodic reclearings by those responsible in the particular localities concerned whenever such become necessary.

The Kalutara, Galle, and Matara Districts can now be considered as well under control. A few minor reinfestations have occurred periodically and with decreasing intensity but these are regularly cleared so that the supply of seed which has previously been shed into the bed of these areas is being gradually exhausted.

In the Hambantota District where the largest infestations have occurred much progress has been made. A regular system of inspection was maintained on all areas, including village tanks, which, but for the timely vigilance of this Department, would by now have fallen into a severe state of reinfestation. Two tanks, however, the existence of which was unknown to the Department, were discovered to be infested for the first time but the matter has been reported to the revenue officer who has taken action to have them cleared. The position of the pest in village tanks is now hopeful and thanks are due to the revenue officer for his support and co-operation.

A discovery of water hyacinth was made in the upper reaches of the Kirama-oya in the Hambantota District, a section of the oya which had previously not been visited, partly on account of the fact that when the lower section was cleared the previous year no hyacinth was discovered for some distance above the uppermost point of the infestation which then occurred. The infestation was promptly taken in hand and the work was nearing completion towards the close of the year.

In Namayawila swamp, the clearing of which on account of its size is impracticable on the usual methods adopted, an effort was made to construct a barricade of plants along the open side of the swamp which would effectively resist the outward passage of hyacinth. Various plants, such as *kettala* (*Susum anthelminticum*), *Acrostichum aureum* and *Panicum repens* L. were tried but with little success.

On the Ranna-oya in the same district, the clearing of which was completed last year, it was found necessary to engage the services of two watchers for reclearing purposes. Several reclearings have been carried out during the year.

In the Ambalantota area, the services of the watcher have been continued and all infested localities have been subjected to at least one clearing. It was found necessary in certain instances to resort to prosecution of private individuals for failing to clear the pest on their lands and this action has had a good moral effect on others.

The total expenditure incurred on water hyacinth eradication in the division for the financial year of 1928-29 amounted to Rs. 3,180.90.

The suggestion has been made that if the swamps which have been infested with water hyacinth in the Hambantota District could be drained the complete eradication of water hyacinth from the district would be accomplished. At present constant reclearings are rendered necessary on the five swamps which have been cleared to some extent while the sixth (Namayawila) clearing is impossible without drainage. Until this last-named swamp can be drained it will ever remain a potential source of infestation for other areas.

It will be seen from the above reports that the determined efforts made by the Department have borne fruit, but, as pointed out, it is necessary that vigilance should be maintained and that in certain parts the problem of water hyacinth should be tackled from a new angle, that of swamp drainage.

EXPERIMENT STATIONS.

On the Experiment Station, Peradeniya, the change-over rubber tapping experiment was continued and cortex measurements were made. Results are not yet available. The first year's tapping of the one-third resting experiment showed that the yield of the plots in which one-third of the trees was rested in turn for one month was only 10 per cent. less than that of the plots which were tapped on alternate days without being rested. The latter plots also showed more brown bast than the former. A new manurial experiment was begun in the New Avenue rubber, and yields of the progeny of Henaratgoda No. 2 were calculated at 773 lb. per acre in 1928-29. The experiment with the forking in of Vigna has shown increased yields in the forked areas, but it remains to be shown whether the increase was due to the incorporation of Vigna with the soil or to the forking alone. In the comparison of clump, avenue, and square planting of rubber, yields and increase of girth were best in clump planting. It was also found that yield from a V-cut is greater than a single cut and that, in alternate and three-day tapping, the latter gives less brown bast. Further, daily tapping in alternate months has induced more brown bast than alternate-day tapping. The work of the Iriyagama Division has been mentioned elsewhere.

The cacao manurial experiment was unsatisfactory. Yields seem to vary with the weather rather than with manuring. A new fermentation and washing room and a new hot-air drying loft were brought into use. The fruit plots were maintained. Work is required on the budding of grapefruit, and it is intended to test mother trees with desirable qualities by budgrafting. The green manure and soil erosion work of the station have been discussed elsewhere. The demonstrations of the use of green manure and cover plants continue to be of great interest to agriculturists.

Many inquiries on the subject of coffee growing were made during 1929, and, though the sales of berries and seed were less in 1929 than in 1928, interest in coffee was well maintained. At Peradeniya robusta types do better than arabica coffee. The valuations of robusta coffee show that the crop can be grown with profit and that it is saleable in London. Since 1926, 27,000 plants and 800 lb. seed have been supplied to smallholders alone.

Australian fodder grasses were introduced during the year and attention continued to be paid to the fodder grasses already established. The sales of roots and cuttings were again large.

At Wariyapola much work has been done to bring the station into good condition. Buildings have been erected and the restoration of the tank has proceeded. A coconut uniformity trial is in progress, and nuts from selected local high-yielding palms and from Malayan dwarf varieties have been planted out. Every attention is being given to the green manuring of coconuts and useful results should be obtained in time. Progress was made in opening up the tobacco station at Ganewatta and the rotational work at Maho was continued.

The Kegalla Experiment Station has continued in excellent condition. Besides demonstrating the economic possibilities of cover crops and of fruit and other trees and plants, it is being used as a centre for multiplying budwood of imported proved clones. At Nalanda efforts to improve the general condition of the station have met with success. Rotation work was continued at Pelwehera. Satisfactory results were obtained, but it is not yet possible to arrive at definite conclusions regarding the system of continuous cultivation most suitable for the district.

The Jaffna Experiment Station continued to work on chillie selection, chillie manuring, fodder and other crops and fodder grasses. At Anuradhapura it was noted that the yields of oil palms increased after hand-pollination. If the palm promises well, extraction of the oil will have to be done with machinery; the present methods are wasteful. Coconut yields were very low and manuring will be tried during 1930. The station has continued to show the value of sisal, citrus, and other fruit trees, plantains, kapok, and other plants and has extended its work to cover demonstrations of creeping, bush and tree green manures. At Vavuniya useful work in dry-zone agriculture has been done. It is discussed elsewhere in this report.

Similarly, the dry-zone work of the Southern Division is mentioned in another section. Progress in the planting of Labuduwa with major crops, citronella grass, fodder grasses, fruit trees, coffee, areca palms, and cinnamon has been maintained, and a small herd of Montgomery cattle has been established. The chillie selection station at Wiraketiya was opened during the year under review; the new cotton selection work at Tissamaharama has been mentioned in another section. Batapola Experiment Station continued its work with pineapples, plantains, coffee, and cinnamon, while at Ibbawela in the Matara District special work on soil amelioration through cover crops, contour hedges and drains, and stone terracing has been done. At Bandara-gama rubber tapping experiments were continued and practical demonstrations were given to villagers in the manufacture of rubber and the treatment of disease. The model smokehouse has continued to be of great interest and has been copied by a local smallholder. Efforts have also been made to encourage and improve fruit cultivation in the vicinity of the station. Useful cotton work was done at Embilipitiya and Kuruwita continued to demonstrate budded rubber and coffee.

COTTON.

Approximately ten tons of seed were distributed in the Southern Province for the 1928-29 season. The seed was selected from the best seed cotton from Magam pattu. Germination was good and growth was normal under the rains of the first part of November. In January and February sickness among the cultivators led to the neglect of large areas which in consequence became very weedy. Some cotton chenas were abandoned and yields were depressed generally. When cultivation and weeding were carried out, yields of 4.5 cwt. seed cotton were obtained. The quality was on the whole lower than that of the previous year. Much of the cotton was late and a large proportion of the crop was harvested at the second picking. The total yield of seed cotton was 3,795 cwt. and the actual purchase of the crop was done between May 1 and 12. Only one purchase was made, an unpopular move that has much to commend it. A second purchase has led in the past to extra expense and a lower quality of cotton.

The crop was brought as usual by the Ceylon Spinning and Weaving Company at prices which have been mentioned in an earlier part of this report. The prices paid to the growers were lower than in previous years, but on the other hand no government subsidy was given.

The Ceylon Motor Transit Company erected a saw gin at Ambalantota and ginned 1,000 lb. of seed cotton. A report on the lint shows that the work of the gin was satisfactory and leads to reconsideration of the question of a ginnery in the cotton area to which the seed cotton purchased from the growers can be taken and from which selected seed can be got for the next season's sowing. At present the seed cotton is taken to Colombo by rail and seed required for sowing has to be brought back to the cotton-growing districts.

The amounts of seed cotton which passed through the hands of the Department in other districts were: Anuradhapura, 5 cwt.; Badulla, 16 cwt.

The finance of the cotton purchase scheme, 1929, was as follows:—

	Rs. c.		Rs. c.
Met from government votes—		Rail freight from Matara to Maradana ..	791 40
Supervision for ginning ..	126 72	Bagging and stitching cotton bags and	
Rail freight on cotton seed ..	59 13	cleaning cotton at Ambalantota and	
Transport of cotton seed from Matara to		Hambantota—	
to Bata-ata and then to other centres..	476 55		Rs. c.
Cost of Weighmaster's beam scale ..	575 50	Liyangastota centre ..	161 39
Rail freight on same from Maradana to		Middeniya centre ..	184 20
Matara ..	1 90	Bata-ata centre ..	150 85
Transport of same from Matara to		Ambalantota centre ..	352 69
Ambalantota ..	20 0	Hambantota centre ..	176 25
	1,259 80		1,025 38
Met from the money lodged by the Mills—		Paid for seed cotton to the cultivators at	
Printing ..	30 75	the different centres—	
Transport of scale from Bata-ata to other			Rs. c.
centres ..	33 0	Middeniya centres ..	17,958 66
Rail freight and transport of gunny bags		Ambalantota centre ..	9,176 18
from Maradana to Matara and then to		Bata-ata centre ..	9,072 32
Bata-ata and other centres ..	189 46	Liyangastota centre ..	8,490 26
Awards to headmen ..	856 50	Hambantota centre ..	7,469 99
Miscellaneous: telephone, telegrams, gunny			52,167 41
strings, &c. ..	63 41		62,588 56
Travelling for purchase of seed cotton,		Received on sale of seed cotton—	
bagging and stitching gunny bags ..	860 86		Rs. c.
Transport of seed cotton—		3488 cwt. 2 qr. 19 lb. clean	
	Rs. c.	seed cotton sold at Rs. 18.50	
By cart from Middeniya to		per cwt. to the Mills ..	64,539 85
Bata-ata ..	1,571 64	98 cwt. 2 qr. 10 lb. dirty seed	
By cart from Liyangastota to		cotton sold at Rs. 9 per cwt.	
Bata-ata ..	746 77	to the Mills ..	887 30
By lorry from Bata-ata to		1 cwt. clean seed cotton sold to	
Matara ..	2,044 20	Mr. Buddhadasa at Bata-ata	15 50
By lorry from Ambalantota to			65,442 65
Matara ..	613 82		
By lorry from Hambantota to		Difference ..	2,854 9
Matara ..	334 16		
	5,310 59		

A cotton breeding station was opened at Tissamaharama during 1929. Its establishment has arisen out of the need for the production of good seed for distribution, and breeding work will be undertaken in time. The station is situated in an area in which extension of cotton growing is likely to take place. Trials are in progress with imported Indian types (*kumpta*, *karunganni*, and *uppam*) and a uniformity trial with Cambodia cotton which will determine the size of plot for future work has been laid down. The results of spacing, manurial, and variety tests undertaken on the various cotton stations of the southern division were of no significance or value owing to the influence of weeds which could not be controlled. The early-weeded plots gave double the yields of the late-weeded plots. General results on cotton rotation stations showed that in the dry zone of the Southern Province the value of even the best rotation is doubtful unless weed control can be assured.

SUGAR CANE.

The cultivation of sugar cane was continued at Allai and jaggery was made. The poor quality of the jaggery was investigated by the Agricultural Chemist and was shown to be due to excess of lime, over maturity of the cane and an excessive furnace temperature during preparation. These defects can be remedied, but it is not clear that the work at Allai will lead further than it has gone. As was pointed out last year, the next development required is the establishment of plant to manufacture white sugar, a step which is not warranted at the moment.

DRY ZONE AGRICULTURE.

When the Director of Agriculture drew attention to the chena problem at the Agricultural Conference in 1926, he said that systematic dry-land cultivation was feasible and that the chena system should be replaced by a system which involved implemental tillage. He pointed out that in certain parts of India the change from shifting to permanent cultivation had been made and said that it was necessary to work out rotations of crops suitable for Ceylon. The question was reviewed at the 1928 Conference, and it was said that the rotation of food and money crops was likely to bring about the greatest development and that a primary consideration was that of the establishment of permanent crops on a successful scale. Money and food crops were discussed and the need for the inclusion of fodder grasses was mentioned. It was reported that results obtained to date were encouraging and that a satisfactory system could be evolved. The outlines of a system were given.

In last year's report it was said that the change from chena to a permanent system of agriculture was possible, that it would have to be made with care and that the following points would require special attention: early cultivation, control of weeds, stumping, green manuring for soil improvement, provision of cattle and implements, fencing, marketing arrangements, and the economic size of holdings. The Department continued to give attention to dry-zone problems in 1929 with special reference to the rotation work on Bata-ata and Middeniya Cotton Rotation Stations in the southern division and Vavuniya Experiment Station in the northern division, and it falls to be recorded that the continuation of work on rotations has brought again to the fore certain difficulties the occurrence of which was not unexpected since attention had been

drawn to them at earlier stages of the work. It has been found in the southern division that kurakkan is unsuitable for a rotation and that maize or sorghum may be substituted for it, but it will be difficult to persuade the cultivators to change from an accustomed article of diet to a new one. The value of a rotation is doubtful when weeds cannot be controlled. Expedients, however, are available in the form of a crop, *e.g.*, sunn hemp, that will clean the land and of tillage with the use of light cultivators and ploughs. Conditions in the southern division seem to point to the necessity for a long rotation, a unit area of about twelve acres for a family of four to six persons and at least four working animals. Part of the area can be under chena while stumping and planting of the first few acres are being done and plantains can be used as a permanent or semi-permanent crop.

In the northern division kurakkan and gingelly can be raised alternately year after year but the weed problem also arises. The latter has led to experiments with dhall as a cleaning crop at Vavuniya which have shown favourable results. It is possible to arrange a rotation with cotton, sorghum, kurakkan, gingelly, dhall, and groundnuts, a scheme which gives two money crops, one fodder crop and three food crops over a period of four years. In addition permanent crops like sisal and kapok are available.

The present position therefore is that it has been shown that food and money crops can be grown in rotation in dry-zone areas, that permanent crops are possible, that fodder grasses can be grown, and that the use of implements is essential in order to cope with weeds and plough in green manures with a view to maintaining the fertility of the soil. Certain difficulties have to be faced but they are not thought to be insurmountable. With attention to the type of implement most suited to the work, with provision of funds for the purchase of cattle and implements (to be paid for in time), with economic blocks of land in selected areas and long leases, with cultivators of an enterprising type, with marketing facilities, and with close guidance from the Department of Agriculture, it should be possible to make an early beginning to demonstrate on a small scale whether a permanent system of agriculture can be substituted for the chena system in the dry zones.

On the other hand, further work on systems of rotation is desirable, particularly investigation of length of rotations and of the best order of crops, and there is little doubt that the improvement of cattle for working purposes is necessary in most districts. The problem of chena cultivation, however, is a pressing one, particularly in view of the scarcity of land for chena in certain districts, and it follows that there is much to be said for making a beginning at once with the demonstrations suggested above. No cut-and-dried scheme that is guaranteed to succeed is ready, but a carefully guided experiment may be undertaken. It is thought that a beginning can be made in two districts and details of the schemes are being worked out for submission to the revenue authorities concerned.

AGRICULTURAL CONFERENCE.

No general conference was held in 1929. Its place was taken by a one-day conference organized by the Tea Research Institute and held at Peradeniya. It has been decided that a general conference will be held in September, 1930.

AGRICULTURAL EDUCATION.

General educative work has taken the usual forms, *i.e.*, lectures, demonstrations of implements, &c.

At the Farm School, Peradeniya, sixteen students finished a two-year course in March and during the remainder of the year there were eight final and fourteen first-year students. Classes for Sinhalese teachers and a Saturday class for students of the Training Colony (fourteen in number) were held. The work of the school remained of a high standard and great interest in their work was shown by the students.

The Jaffna Farm School had eight first-year and six second-year students, and it continued its useful work in vernacular classes for teachers and headmen and in a three months' course for farmers' sons. Stress has been laid in the teaching on the methods of making better use of the land and of increasing yields.

The Labuduwa School began its work with only one student. It is not yet fully equipped and steps are being taken to provide a teaching laboratory during 1930.

With regard to school garden work, the visits of departmental officers to gardens in their districts were continued. Improvement of economic and fruit sections has been noted, but many school gardens are handicapped by want of a good water supply and of fences and by a shortage of implements. General progress is slow and the standard of knowledge and keenness is lower than can be desired. There is a tendency to grow the crop that does well and to omit to keep crop records which can be made of interest and value as a means of instruction. Rotation work is not given sufficient attention and much improvement of conditions can be brought about by attention to terracing of steep slopes, green manuring, and methods of soil amelioration and conservation in general.

CINEMATOGRAPHY.

The Plant Pest Inspector of the Central Division (Mr. N. K. Jardine) reports as follows:—

At the commencement of the year a portable cinematograph outfit was provided for the Division consisting of a Cine Kodak Model B with 3.5 lens, and a Kodascope Model A, together with all necessary accessories for illumination by generated electric current and battery current, the cutting, splicing, and editing of films, the storage of films, portable screens for projection, &c.

Paddy Film.—In order to learn the technique of cinematography necessary for the requirements of the Department it was decided that a start should be made on a film of the simplest nature and the subject of paddy cultivation was decided upon. As the work progressed successfully the paddy film was divided into two sections. The first illustrates paddy cultivation under village conditions of the Kandy District, and the second shows the

cultivation of the grain under the system of Ratamahatmayaship. The prevailing customs under both conditions are illustrated. All that remains to finally complete the film for public exhibition is the photographing of the titles (which are in English and Sinhalese and which are ready for the process) and the splicing of them in the correct positions in the films. There are approximately 800 feet in each section and the display of the two sections is timed to occupy three-quarters of an hour.

This film though lacking the titles has been shown to varied audiences consisting of educated and illiterate persons, keen educationists and the contrary, the townsman, the agriculturist, the propagandist, the progressivist and the sceptic, but all admit that this type of film and the type of apparatus used for projection is a powerful agent in the progress of education among villagers under Ceylon conditions. The worth of this type of machine, its cheapness, its efficiency, its portability, cannot be too highly estimated as a means of reaching and promoting the interest of the villager.

During the year sanction was received to proceed with the manufacture of four other films, namely, (1) Methods of sanitation against insects, (2) Termites, (3) The porcupine and its damage to rubber, (4) The development of an insect, and (5) Plant sanitation. Nos. (1), (2), and (5) are progressing toward completion; several episodes of each have been photographed; other episodes are required to complete the pictures after which sectioning, arranging, splicing, and the photographing and introduction of titles remain to complete them. With regard to No. (3), the porcupine and its damage to rubber, no progress has been made. Several localities have been selected and tried as a venue for the taking of the picture, but in each case serious difficulty has arisen in procuring live and suitable specimens of the animal. Without live specimens there is no possibility of taking the picture. In October all arrangements were in train for a serious effort to complete the picture on an estate in the North Matale District, but they were postponed in view of the Inspector's early transfer to Kurunegala.

Insect Film.—From experience with, and a knowledge of, the limitations of the present type of camera it has been found that the filming of the development of an insect is not possible without models as the camera carries no means by which magnification of an object may be made. It was the intention of the Inspector to submit a report on another model of the same camera which embodies all the necessary adjuncts for this particular type of cinematography, and with which it would be possible to take all manner and kinds of cinematophotos.

SEED AND PLANT DISTRIBUTION.

The work of the Central Seed Store continued to increase during the year under review. It has been mentioned that over five tons of seed of green manures were distributed. Grafted plants, pineapple suckers, and seed of sorghum, groundnuts, kapok, tea, jak, sunn hemp, and cowpea, to mention only a few, were sold in quantity. The revenue derived from the sale of plants and seeds was Rs. 46,985.55 in 1929 as against Rs. 36,834 in 1928. Free issues fell in value from Rs. 4,486.89 in 1928 to Rs. 3,214.13 in 1929.

CO-OPERATION.

A full report on co-operative work will be published separately by the Joint Registrar of Co-operative Societies.

PUBLICATIONS.

The following publications were issued during the year:—

The Tropical Agriculturist, Vols. LXXII. and LXXIII.

Govikam Sangarawa, Vol. XXIV.

Kamat Tholil Velakkam, January-September (monthly); October-December (quarterly).

Bulletins: No. 85, Termite-proof construction of buildings in Ceylon; No. 86, Report on tea termites.

Leaflets: No. 57, Green manuring with particular reference to coconuts; No. 58, Budgrafting and seed selection of rubber.

Sinhalese Leaflet: No. 56.

The Annals of the Royal Botanic Gardens, Peradeniya, Vol. XI., Pt. 2 (The Ceylon Journal of Science, Section A. Botany).

The *Kamat Tholil Velakkam* was issued in an enlarged form from October and a quarterly issue has replaced the monthly publication. The revenue derived from the sale of publications amounted to Rs. 26,568.82.

BOARD OF AGRICULTURE.

The Executive, Estate Products and Food Products Committees which were elected in 1927 for a period of three years remained in office.

The Estate Products Committee met five times and discussed the following matters:—

Progress reports of the Experiment Station, Peradeniya.

Budded rubber: rubber seed gardens.

Nettle grub and brown bug in Uva.

Modification of proposals for the planting of the Iriyagama Division of the Experiment Station, Peradeniya.

Representation of research schemes on the Estate Products Committee.

Paris Green treatment of termites of tea.

Latex tube bore.

Paspalakanda.

Tortrix returns.

Can coconuts economically produce sugar, alcohol, or acid?

Depression in the coconut industry.

Danthonia grass.

Recent experience in the growing of coffee in Ceylon.

The effect of growing by-products among young coconuts.

The food value of copra.

The Kalutara snail.

Chilaw coconut trials.

Permanent cultivation on unirrigable land in the North-Central Province.

Dry-zone agriculture.

Tea tortrix regulations.

The Food Products Committee met in June and discussed the following subjects:—

- Notes on the working of a land development scheme in the North-Central Province.
- Committees appointed to inquire into the conditions of paddy cultivation.
- Consideration of the desirability of publishing a profit and loss account of paddy experiments.
- Leguminous crops in young coconuts and rubber.
- The encouragement of growing of fruits through village fairs and central markets.

COMPETITIONS AND SHOWS.

Details of competitions and shows will be found in the reports of the Divisional Agricultural Officers. The following gentlemen kindly gave prizes:—Mr. E. S. Captain, Veda-Mudaliyar W. Daniel Fernando Waidyasekera, Sir S. Schneider, Mr. Chas. Chitty, and Mr. R. Segarajasingham.

STAFF CHANGES AND DEPARTMENTAL EXAMINATIONS.

The following officers were successful in examinations held during the year:—

- Junior Departmental.*—Messrs. V. G. Perera, T. C. de Sylva, M. W. Jayasuriya, P. A. Gooneratne, W. P. Karannagoda, Joubert de Zylva, J. A. Rambukpota, A. V. Chelvanayagam, and F. A. M. Sandrasagara. K. D. S. S. Nanayakkara (Field).
- Probationers.*—Messrs. J. E. Seneviratne, S. P. Fernando, W. A. Singapully, W. N. Fernando, L. D. C. M. Fernando, and G. B. Richards.
- Vernacular Examinations: Sinhalese.*—Messrs. A. C. A. Dassanaike, J. E. Seneviratne, W. N. Fernando, K. D. S. S. Nanayakkara, N. Krishnapillay, H. F. Davidson, W. A. Singapully, N. Senathiraja, H. A. Pieris, and L. D. C. M. Fernando.
- Tamil.*—Messrs. A. C. A. Dassanaike, K. D. S. S. Nanayakkara, N. Krishnapillay, V. Ponnuchamy, and R. K. Thambiah.

The following changes took place:—

Mr. F. A. Stockdale ceased to be Director of Agriculture on being appointed as Assistant Agricultural Adviser to the Secretary of State for the Colonies. Dr. W. Small, M.B.E., Mycologist, continued to act as Director of Agriculture, and Mr. M. Park continued to act as Mycologist.

Mr. J. I. Gnanamuttu returned to the Island on February 18, 1929, and resumed work as Office Assistant. He was seconded for service from October 1, 1929, as Secretary, Coconut and Rubber Research Schemes, and Mr. A. Visvanadhan, B.A., Chief Clerk, acted as Office Assistant, and Mr. A. B. Chelliah acted as Chief Clerk.

Mr. T. H. Parsons returned to the Island on October 15, 1928, and resumed work, and Messrs. J. J. Nock and K. J. Alex Sylva resumed duties as Curator, Hakgala Gardens, and Assistant Curator, Henaratgoda Gardens, respectively.

Mr. T. H. Holland left for England on March 15, 1929, and returned to the Island on November 10, 1929. Messrs. G. Harbord and L. Lord acted as Manager, Experiment Station, Peradeniya, in succession.

Mr. F. Burnett left for England on transfer to British Guiana on July 4, 1929, and Mr. G. Harbord took up work as Divisional Agricultural Officer, Central Division. Mr. W. R. C. Paul was appointed Divisional Agricultural Officer from November 6, 1929, and took charge of the southern division.

Mr. A. H. G. Alston left for England on May 8, 1929, and Messrs. L. Lord, E. J. Livera, and S. D. J. E. Senaratna acted in turn as Systematic Botanist.

Mr. E. J. Livera returned to the Island on August 7, 1929, after completing his studies at Wye College and took up work as Acting Systematic Botanist.

Dr. J. C. Hutson left for England on September 11, 1929, and Mr. F. P. Jepson, Assistant Entomologist, acted as Entomologist.

Mr. N. K. Jardine, Inspector, Plant Pests and Diseases, had medical leave (within the Island) from December 1, 1929, and Messrs. E. J. Livera and S. J. F. Dias acted in succession.

Mr. G. E. J. Hulugalle, Divisional Agricultural Officer, North-Western Division, died on December 5, 1929, and Mr. E. J. Livera was appointed to act in his place.

Mr. L. Lord went on leave on December 18, 1929, and Mr. G. V. Wickremasekera acted as Economic Botanist.

The following appointments were made:—

Clerical.—Mr. S. Somasunderam, Clerk, Class II., to Head Office; Mr. A. C. Weerasinghe, Clerk, Class II., to Co-operative Office; Messrs. P. Visvalingam, B. S. Christopher, E. A. Wijeweera, W. S. Sirisena, and S. Sangarasivam to Class III. clerkships; Messrs. N. Kanagasabapathy, D. W. Wijesekera, K. M. U. Jayanetty, and M. J. Pillainayagam to Class III. clerkships in the Co-operative Office.

Agricultural.—Mr. W. R. C. Paul as Divisional Agricultural Officer; Mr. R. E. Ponniah as Lecturer, Farm School, Peradeniya; Messrs. N. Wickremasinghe and H. P. B. Ellegala as Probationers; Messrs. D. J. Jayasekera, S. L. M. Kathir Mohamed, and A. E. W. Goonewardene as Assistant Foremen; Mr. F. W. de Silva as Plant Collector; Messrs. K. B. Doranegama, Alfred Herat, C. M. B. Ranawana, D. A. W. Gunawardena, K. B. Bulankulama, and S. S. Christopher as Inspectors of Co-operative Societies; and M. J. Fonseka as bookbinder.

Resignations.—Mr. W. F. Seneviratne, Sub-Inspector, Plant Pests and Diseases, and V. M. Alphonsus, bookbinder.

Retirements.—Messrs. L. de Z. Jayatilleke, Inspector of School Gardens, and J. M. Silva, Plant Collector. Mr. B. D. Chandrasekera, Clerk, Class III., died on October 7, 1929.

The following transfers were made:—

Clerical.—Mr. I. P. Iyacuuddy, Clerk, Class II., Batticaloa Kachcheri, exchanged duties with Mr. P. Coomaraswamy, Clerk, Class II., Co-operative Societies Division; Mr. C. L. de S. Wijesundera, Clerk, Class II., North-Western Division, was transferred to the Education Department; Mr. F. W. L. Wickremesekere in place of Mr. M. V. Selvanayagam, Clerk, Class III., transferred to Matale Police Court; Mr. N. Gregory to Customs Department; and Mr. A. C. Amerasinghe, Clerk, Class III., in place of Mr. B. D. Chandrasekera, deceased.

Agricultural.—Mr. W. C. Lester Smith, Inspector of Plant Pests and Diseases, Southern Division, to the Central Division; Mr. N. K. Jardine, Inspector of Plant Pests and Diseases, Central Division, to the North-Western Division; Mr. C. N. E. J. de Mel, Inspector of Plant Pests and Diseases, North-Western Division, to the Southern Division; Mr. R. N. Sinnaiyah, Senior Agricultural Instructor, Northern Division, to be Manager, Experiment Station, Anuradhapura; Mr. W. P. Karannagoda, Agricultural Instructor, Matugama, with Mr. E. A. Peiris, Foreman, Experiment Station, Peradeniya; Mr. W. B. Mahagedera, Agricultural Instructor, Bibile, to Pannipitiya; Mr. R. Siriwardena to Royal Botanic Gardens, Peradeniya.

REVENUE.

The following is a statement of receipts for the financial year 1928-29:—

	Rs.	c.		Rs.	c.
(1) Sale of seeds and publications ..	42,006	94	(10) North-Western Agricultural Division ..	2,886	51
(2) Botanic Gardens, Peradeniya ..	8,386	74	(11) South-Western Agricultural Division—		
(3) Botanic Gardens, Hakgala ..	1,470	12	Experiment Station, ..		
(4) Botanic Gardens, Henaratgoda ..	310	70	Balangoda ..	41	70
(5) Botanic Gardens, Nuwara Eliya ..	—		Experiment Station, Goda-		
(6) Experiment Station, Peradeniya ..	24,608	12	kawala ..	265	66
(7) Southern Agricultural Division ..	Rs. c.		Experiment Station, ..		
Plant Pest Inspector, Southern ..	5,931	19	Veyangoda ..	60	0
	16	70	Experiment Station, Kuru-		
		5,947	wita ..	35	16
(8) Northern Agricultural Division—			Experiment Station, Batu-		
Experiment Station, Jaffna ..	2,403	9	gedera ..	271	0
Experiment Station, Anuradhapura ..	3,887	44	Experiment Station, ..		
Experiment Station, Trincomalee ..	542	33	Embilipitiya ..	67	41
Experiment Station, Mannar ..	126	12			740 93
Experiment Station, Vavuniya ..	391	11			
Experiment Station, Kili-nochchi ..	3,572	29	(12) Eastern Agricultural Division—		
Experiment Station, Allai ..	423	13	Experiment Station, Bibile ..	67	46
Farm School, Jaffna ..	2,154	50	Experiment Station, Batticaloa ..	433	70
Agricultural Instructor, Jaffna East ..	108	0	Senior Agricultural Instructor, Badulla ..	154	50
		13,608			655 66
(9) Central Agricultural Division ..	1,677	66			112,843 47
Farm School, Peradeniya ..	10,544	19			
		12,221			
		85			

EXPENDITURE.

The gross expenditure of the Department, including clerical services, stores, and stationery, during the financial year 1928-29 was as follows:—

	Rs.	c.		Rs.	c.
Salaries ..	493,371	9	Prevention of plant pests and diseases ..	10,901	49
Travelling ..	88,844	68	New Peradeniya lands ..	828	48
Incidentals ..	8,414	58	Special expenditure—		
General: Labour and Upkeep—			Grants in aid of agricultural shows and competitions ..	6,705	25
Peradeniya Gardens ..	25,410	57	Training of secretaries for co-operative societies ..	4,220	59
Hakgala Gardens ..	7,623	97	Experiments and demonstrations in paddy manuring and seed selection ..	40,887	99
Henaratgoda Gardens ..	3,197	19	Upkeep of additional minor experiment and demonstration plots ..	38,846	82
Nuwara Eliya Gardens ..	1,662	4	Cotton experiments ..	25,630	21
Experiment Stations—			Maintenance of Davie's Tree, Katugastota ..	245	24
Peradeniya ..	40,681	98	Sugar-cane experiments ..	3,500	0
Jaffna ..	11,663	47	Grant to Imperial Bureau of Entomology ..	6,666	67
Anuradhapura ..	17,550	15	Grant to Imperial Bureau of Mycology ..	4,000	0
Chilaw Coconut Trial Ground ..	2,239	92	Expenditure in connection with Rubber Research Scheme ..	67,500	0
Henaratgoda ..	928	67	Scholarships for higher training in Agriculture ..	6,466	11
School and Home Gardens: Labour and Upkeep ..	14,096	58	Establishment of Agricultural School, Galle ..	44,476	1
Agricultural Education—			Establishment of Agricultural School, North-Western Province ..	28,140	82
Salaries ..	17,630	42	Allowances to co-operative officers in training in India ..	9,183	21
Lecturing fees ..	1,768	64	Repairs to roads in Royal Botanic Gardens ..	4,999	0
Laboratory ..	3,452	99	Additional equipment for library, &c. ..	4,096	79
Incidental expenses ..	3,357	15	Establishment of cattle breeding herds ..	7,017	93
Dairy ..	4,346	48	Cinematograph equipment ..	1,898	99
Labour and upkeep ..	5,305	78	Grant to Imperial College of Tropical Agriculture, Trinidad ..	6,666	66
Dieting of students ..	8,289	29	Rubber Restriction Fund ..	23,734	29
Co-operative Societies—					1,233,492 85
Salaries ..	37,499	17			
Travelling ..	40,409	12			
Incidental expenses ..	4,182	53			
Seed Store and Publication Depôt—					
Salaries ..	9,336	55			
Seed distribution ..	11,123	44			
Publications ..	15,397	24			
Incidental expenses ..	803	1			
Upkeep of library, &c. ..	8,293	60			

The expenditure may be itemized under the following sub-heads:—

	Rs.	c.		Rs.	c.
Administration	77,518	74	Divisional experiments, including experimental cultivation of cotton and experiment stations in Jaffna, Anuradhapura, and other experimental plots ..	340,631	57
Research : Scientific investigations, including central experiment station ..	454,575	74	Co-operative societies ..	95,597	42
Botanic Gardens	84,473	62	Seed Store and Publication Depot ..	36,660	24
Agricultural education, including School of Tropical Agriculture, Farm School, Jaffna, school gardens, grants to shows and competitions	144,036	2			
				1,233,493	35

Press Communiques.

The following *Press communiques* were issued during 1929:—

Vegetable Garden Competition, Galboda and Kinigoda Korales, 1928-29.
 Vegetable Garden Competition, Batticaloa District.
 Vegetable Garden Competition, Trincomalee District.
 Vegetable Garden Competitions, Kukul Korale.
 Chillie Cultivation Competition, Jaffna District.
 Vegetable Gardens Competitions, Kalutara District, Maha 1928-29.
 Kurunegala Paddy Weeding Competition.
 Paddy Cultivation Competition, Pitigal Korale North.
 Paddy Cultivation Competition, Rajakumara Wannu Pattu.
 Plantain Garden Competition in Kotmale Division, Nuwara Eliya District.
 Paddy Cultivation Competition, Pitigal Korale South.
 Pahala Talampitiya Co-operative Society Paddy Weeding Competition.
 Vegetable Exhibits Competition at Chunnakam and Chavakachcheri.
 Curry Stuffs Cultivation Competition, Matale District.
 Vegetable Garden Competition, Matale South.
 Deraniyagala School Home Garden Competition.
 Curry Stuff Cultivation Competition, Chilaw District.
 Paddy Cultivation Competition, Matale East, Maha 1928-29.
 Pure-line Paddy Cultivation Competition, Yatinuwara and Harispattu Areas.
 Paddy Cultivation Competition, Matale South.
 Schneider Challenge Cup Competition, Central Division.
 Medicinal Herbs Cultivation Competition, Central Division.
 Medicinal Herbs Cultivation Competition, North-Western Division.
 Schneider Challenge Cup Competition, North-Western Division.
 School Garden Competitions in Kalutara and Galle Districts.

W. SMALL,

Acting Director of Agriculture.

Peradeniya, February 28, 1930.

REPORT OF THE DIVISION OF SYSTEMATIC BOTANY, 1929.

GENERAL.

MR. A. H. G. ALSTON, Systematic Botanist, went on leave on May 8, Mr. L. Lord, Economic Botanist, acted from June 8 to June 30, Mr. E. J. Livera from August 7 to November 19, and Mr. S. D. J. E. Senaratna for the rest of the period.

HERBARIUM.

Five hundred and thirty-eight specimens and 3 lots of Indian sea-weeds were sent in for identification. Among these were timber specimens of *Albizzia odoratissima* Benth., *Lagers-troemia speciosa* Pers., and *Palaquium rubiginosum* Engl. Dried flowers for class work and herbarium material of tropical woody plants representative of eighteen families were sent to the Imperial Forestry Institute, Oxford. Specimens of a conifer were sent for determination to Kew, to the British Museum, to the Arnold Arboretum, Massachusetts, to Sibpur, Calcutta, to the Government Systematic Botanist, Coimbatore, and to the Forest Botanist, Dehra Dun. Twenty-nine specimens of Ceylon lichens for determination, a set of liverworts from Kew and a set of duplicates from the seed collection were sent to Kew. Thirty-six specimens of mosses and a further collection were sent to H. N. Dixon, Northampton, for determination. Forty-seven specimens and a second lot of Thwaites' mosses were also sent to him. A collection of Ceylon plants was sent to E. D. Merrill, California, and 143 specimens were received from him. Specimens of a *Terminalia* for determination and 37 specimens of Ceylon plants were sent to Brisbane, Queensland. A collection of living orchids was sent to Mrs. E. Colman, Victoria, and 27 packets of seeds were received from her. Three specimens of Ceylon mosses were sent to Fr. Verdoon, Holland, for determination. 147 specimens of mosses and 10 of ferns were sent to the Smithsonian Institute, Washington. A collection of Ceylon plants was sent to A. Bor-gesen, Copenhagen, and some specimens of ferns were received from him. A collection of seeds of Ceylon varieties of *Luffa* was sent to the Bureau of Introduction, Leningrad. Seeds of *Crepis fuscipappa* Clarke were sent to E. B. Babcock, California. Seeds of 2 species of *Acacia* were sent to Sydney. Seeds of *Vigna marina* Merr. were sent to Kuala Lumpur. Three packets of liverworts were sent to S. R. Kashyap, Lahore, for determination. Twelve specimens of liverworts were received from him. A collection of North Indian grasses and other specimens was received from the Forest Botanist, Dehra Dun. Thirty specimens of East African grasses were received from P. J. Greenway, Tanganyika. Three specimens of *Datura Metel* Linn. were received from the Government Systematic Botanist, Coimbatore. Twenty-nine specimens

of sea-weeds were received from Mrs. Weber van Bosse, Holland. Three lots of Indian sea-weeds were received from A. B. Kotwal, Karachehi, for identification. Seventy-five specimens of sea-weeds were also received from him. A collection of fresh water diatoms together with 4 lots of marine diatoms gathered by the Marine Biological Department, Ceylon, was sent to B. W. Skvortzow, Harbin, China. Fixed material of developmental stages of flower and fruit of 6 Ceylon species of *Podostemaceae* was sent to Prof. N. K. Tiwary of Benares Hindu University. Ovules of *Cycas Rumphii* Miq. were sent to R. M. Harrison, Wye, Kent. Material of *Centrosema Plumieri* Benth., *Entada scandens* Benth., and *Tephrosia candida* DC. was sent to Kew for investigation of insecticidal properties. Seeds of *Hydnocarpus venenata* Gaertn., *H. anthelmintica* Pierre var. and *Taraktogenus heterophyllus* v. Sl. were sent to the Agricultural Chemist, Peradeniya, for analytical study.

Seeds or plants of *Atylosia albicans* Benth., *A. scarabaeoides* Benth., *Cassia didymobotrya* Fresen., *C. hirsuta* Linn., *Crotalaria multiflora* Benth., *C. striata* DC., *Desmodium Cephalotes* Wall., *D. pulchellum* Benth., *D. triquetrum* DC., *Dunbaria Heynei* W. and A., *Flemingia strobilifera* Br., *Glycine javanica* Linn., *Heylandia latebrosa* DC., *Indigofera Colutea* Merr., *I. glabra* Linn., *I. nummularifolia* Liv., *I. suffruticosa* Mill., *Mundulea suberosa* Benth., *Phaseolus Grahamianus* W. and A., *Rhynchosia cana* DC., *R. rufescens* DC., *Rothia trifoliata* Pers., *Shuteria vestita* W. and A., *Stylosanthes fruticosa* Alst., *Tephrosia pumila* Pers., *T. tinctoria* Pers., and *Vigna marina* Merr. were sent to the Experiment Station, Peradeniya, for trial as cover plants.

Among the many plants sent to the Royal Botanic Gardens, Peradeniya, were 6 Ceylon species of *Calamus*. Cones of 10 species of conifers were received from the Botanic Gardens, Hakgala. Seeds of *Mimosa Speggazzinii* Pir. were received from Prof. N. G. Ball of University College, Colombo.

Visits were made by the staff to the following places:—Bibile, Dambulla, Dehiwala, Doluvekanda, Ella, Ekeriyankumbura, Gampaha, Ganewatta, Hakgala, Horton Plains, Kadugannawa, Kurunegala, Nuwara Eliya, Ohiya, Palagolla, Pasdun korale, Pattipola, Pidurutalagala, Ramboda, Ratnapura, Ruanwella, and Wellawatta.

1,750 sheets were added to the general herbarium, 393 to the Ceylon herbarium, and 98 to the garden herbarium.

MUSEUM.

218 specimens were collected for the show tins. Six specimens of medicinal products were replaced by new ones. Nine varieties of fruit were preserved in formalin. 128 new labels were printed for the show tins. Canes of 6 Ceylon species of *Calamus* were exhibited on the upper floor. Seventeen wood specimens were received from the Forest Department, Ceylon. A specimen of an abnormal inflorescence of the coconut sent by Mr. A. M. Cheyne of Nattandiya has been placed on exhibition.

The laboratory was used at different periods by Prof. N. K. Tiwary of Benares Hindu University, Prof. Dr. F. A. F. C. Went of Utrecht, and Dr. Alma G. Stokey of the Women's Christian College, Madras.

PUBLICATIONS.

Alston, A. H. G. Names published in Moon's Catalogue. *Annals of the Royal Botanic Gardens, Peradeniya*, Vol. XI., Part 2, March 12, 1929.

Alston, A. H. G. The Flora of Maragalkanda. *Annals of the Royal Botanic Gardens, Peradeniya*, Vol. XI., Part 2, March 12, 1929.

King, H. C., and Alston, A. H. G. The Botanical Identity of Tawenna and allied Timbers. *Annals of the Royal Botanic Gardens, Peradeniya*, Vol. XI., Part 3. In the Press.

Alston, A. H. G. Short Notes. Roxburgh's Hortus Bengalensis. Inverted flowers in the Leguminosae. *Annals of the Royal Botanic Gardens, Peradeniya*, Vol. XI., Part 3. In the Press.

Senaratna, S. D. J. E. Some Abnormalities of the Coconut. *Annals of the Royal Botanic Gardens, Peradeniya*, Vol. XI., Part 3. In the Press.

Senaratna, S. D. J. E. An Abnormal Rose. *Annals of the Royal Botanic Gardens, Peradeniya*, Vol. XI., Part 3. In the Press.

Peradeniya, February 10, 1930.

S. D. J. E. SENARATNA,
Acting Systematic Botanist.

ANNUAL REPORT OF THE CURATOR, ROYAL BOTANIC GARDENS, PERADENIYA, 1929.

IMPROVEMENTS to the gardens have been undertaken during the year in many directions, and progress in the upkeep of the botanical collections has been maintained. Particular attention has this year been given to the flower garden section and to the new fruit plants and nurseries. Remetalling of paths and roads has also made considerable progress, and the general appearance of the gardens has thereby been much improved. Labour attendance has been satisfactory and all routine work has in consequence been kept well in hand. The gardens water service supply has this year been tapped to supply the gardens and garages of the new bungalows at Peradeniya with the result that the gardens are handicapped by an insufficient supply on the approach of dry conditions and throughout periods of drought. The rainfall distribution for 1929 has been most erratic, though the aggregate for the year reached the normal average. Six months show remarkable shortages and the remainder similar excesses, the shortages occurring in January (.70 against average of 3.96 in.), February (.42 against 1.82 in.), May (3.98 against 6.36 in.), August (1.42 against 6.38 in.), October (5.91 against 13.25 in.), and December (4.85 against 8.32 in.) or only 17.28 in. for the above six months against an average of 40.09 in.

ARBORETUM.

The progress in upkeep of this section of the gardens has been maintained, previous years' plantings having been well kept up and many new plantings being made this year. The widening, metalling, and tarring of the paths now in hand throughout the groups facilitates access to such, and will further open up this part which now begins to present the woodland appearance originally aimed at in addition to the value of its economic contents.

The new additions made this year comprise many new and interesting species including the following:—

Eucalyptus naudiniana F. Muell.
Eucalyptus salubris F. Muell.
Eucalyptus viminalis Labill.
Grevillea hilliana F. Muell.
Hymenaea Courbaril Linn.

Inga spectabilis Willd.
Inga spuria Humb. and Bonpl.
Myoporum sandwicense A. Gray.
Vitex Keniensis Turrell.
Kylia Kerrii Craib and Hutchinson.

PALMETUM.

No casualties occurred of plantings made last year, and several new additions to the collection have been put out. The area originally allotted to group IV. of the Palmetum, the largest of the groups, is becoming congested and more space will be necessary for future plantings. It will be necessary shortly to remove the present students' garden to a new site to allow the area occupied by this garden to become available for the extension of this group of palms. Since group IV. comprises two areas on the north and south borders of the students' garden, respectively, the removal of the latter allows these areas to be linked up to form one large area. New plantings made this season include the following:—

Cocos quinquifolia Barb. Rodr.
C. eriospatha Mart.
C. campestris Mart.
Corypha elata Roxb.
Normanbya Merrillii Becc.

Pritchardia affinis var *gracilis* Hort.
Thrinax argentea Lodd.
Trithrinax campestris Drude and Griseb.
Washingtonia sonorae S. Wats.

The palms in the new Talipot avenue laid down last year are progressing well.

PINETUM.

The extension to the Pinetum formed last year has developed satisfactorily and the area is now well carpeted with grass and the plantings beginning to make good growth. A few casualties occurred among the Junipers and the vacancies so caused have been filled with new plants of *Pinus caribaea* Morelet, the Cuban pine and *Cupressus lusitanica*, the latter raised from seed received from the Amani Institute, Tanganyika, in 1927. It should be mentioned as a note of botanical interest that our older Conifers, such as *Agathis robusta* and *Araucaria Cunninghamii*, the introduction of which dates back to 1865 and 1848, respectively, and of which we possess many fine specimens, fail to produce fertile seed. The former produced fertile seed for the first and only time in 1917, and the latter have yet to be recorded as producing fertile seed.

FLORICULTURE.

The appearance of the flower garden and plant houses has been considerably improved and a blaze of colour is usually to be seen here. The arrangement of a permanent Upper Gardener in charge with a regular staff of coolies has engendered much keenness in the coolies for their work and the result is gratifying. The pergola for the woody climbers is now well furnished, and, owing to the variety of climbers now represented there, a good show of colour is to be seen at various periods of the year. The plants include *Congea tomentosa*, *Odontadenia Harrisii* and *O. speciosa*, *Bignonia magnifica* and *B. venusta*, *Thunbergia fragrans*, *T. Myosorensis* and *T. grandiflora*, *Roupellia grata*, *Passiflora vitæfolia*, *Securidaca valubilis*, *Pereskia Blea*, *Chonemorpha macrophylla* and *Oxera pulchella* among the more prominent. The espalier for the less woody climbers on the north side of flower garden has been rebuilt, the brick and cement pillars having become very unstable. Consequent on this, all the climbers were pruned back hard and have since formed new and vigorous growth, whilst new additions planted out here include *Thunbergia chrysops* and *Vitis discolor*, brought from Kew last year, together with new species of *Passiflora* and *Ipomoea*.

The flower garden proper has formed the basis of a regular and attractive show of all types, the flowering of the *Cassia multijuga* trees being particularly showy this year. Trials have been successfully made with many new types of perennials, the more attractive being a bed of scarlet *Pentas*, the pink bracketed form of *Poinsettia* raised from cuttings of the plants brought from England last year and also the combination in beds of the various varieties of *Gerbera Jamesoni* with *Spathoglottis plicata* and *S. Veillardii*. A bed of well-grown specimens of the Ceylon "bindara," *Exacum zeylanicum* has flowered remarkably well and a new *Buddleia* sp. received from Miss Tilly of Talawakele has proved a useful asset; a blue form of the "lace flower," *Didiscus coeruleus*, has been obtained and should prove a useful acquisition also. The tree Dahlias and imported Australian Dahlias have flowered well during the year and the various beds of *Celosia plumosa*, *Anthus italicæ*, with the white, blue, and scarlet forms of the budding *Verbena* continue to add to the attractiveness of this area. The orchid collection in the Orchid House now much augmented by last year's additions from Sanders and Sons, has afforded visitors a very attractive display. Though many of the plants housed here are principally of botanic interest and afford little in the nature of a floral display, those such as *Cattleya*, the *Laelio-cattleya*, *Brasso-cattleya*, *Dendrobium*, *Coelogyne*, *Arundina*, *Vanda*, *Epidendrum*, *Oncidium*, *Phalaenopsis*, *Lycaste*, *Stanhopea*, *Rhyncostylis*, and others have flowered during the year and been much appreciated by visitors. The Octagon House has gained in attractiveness both in foliage and flower by the addition of the new plants brought from England last year, the outstanding features being the flowering of the new *Achemenes*, the *Nepenthes*, *Isoloma hirsutum*, and *I. President Chandon* with *Bertolonia marmorata* and *B. maculata*.

ROADS AND PATHS.

The additional vote allotted for metalling roads and paths for the past two years has been deducted in the current financial year's votes, the work in the remetalling of roads ceasing thereby in September, 1929. To that date a total of 5,580 yards of 13-ft road had been metalled (of the 7,920 yards required to complete the garden roads), 3,520 yards of which were commenced and completed during the 1928-29 financial year. The metalling and tarring of paths is being continued under the general Gardens vote and to date some 2,705 yards have been completed during the year under review. Of the total metalled some 2,139 yards have to date been tarred and in some cases retarred, leaving 566 yards of metalled paths to be tarred during the coming dry weather. The remaining paths to be metalled and tarred total approximately 1,000 yards, there being 850 yards in the Arboretum and 150 yards in the Fernery paths which it is hoped to complete during 1930. All paths have been brick-edged and bricks pointed with cement, and with paths thus defined and consolidated the unsightly side drains are being eliminated. The work creates a vast improvement to the areas these paths traverse and further upkeep should be very small, merely an annual coating of tar during the dry weather.

PROPAGATION.

Citrus budding progresses slowly owing to shortage of good budwood of all kinds. Large numbers of budded fruits persisted in dying back after budding due chiefly to excessive moisture at the roots during the monsoons and the lack of sufficient drainage in the nursery area. Steps taken to remedy this by raising new beds of prepared soil under cadjan covered sheds and raising stocks therein were successful and all buddings made on outside stocks are now potted at approximately five weeks from budding and are kept in large bamboo pots under cover till well established. The percentage of casualties has been considerably reduced by this method. The stocks on which the various types of grape fruit, orange, lime, and mandarin have been budded now include the sour orange, pumelo, lemon, citron, and nattaran. Other types coming along for later trial as stocks include *Citrus Hystrix* D.C., a local semi-wild species. *C. megaloxycarpa* Lush. a locally planted species but not yet found wild, *Citrus mitis* Bo. the "Kalamondin" received from Manila and reputed resistant to citrus canker, and the Chinese lime, and Mindera lime received from the Philippines. Seedlings of the Chaulmoogra oil plant have been supplied to the Superintendent, Etnawalla Estate, Ambepussa, and to the Superintendent, Sorana Estate, as follows:—

Etnawalla : 160 *Hydnocarpus Wightiana* and 10 lb. seed
 160 *Taraktogenus Kurzii*.
 Sorana : 200 *Hydnocarpus Wightiana*.

1,200 seedlings remain in stock in bamboo pots for further disposal.

Seedlings of the Tung Oil tree, *Aleurites Fordii*, raised from seeds received from Kew in March last, were available for distribution during the north-east monsoon, and, in reply to advertisements in the local papers, 48 applications were received. Stocks in hand allowed a distribution of six plants only to each applicant and these were supplied in rotation of receipt of order, the geographical distribution covering practically all districts of the Island. Five pounds of seed of *Aleurites montana* and 16 pounds of seed of *Aleurites Fordii* were received from the Economic Botanist, Kew, in May last and distributed to estates as follows:—

Superintendent, Mariawatte Estate, Gampola, 2½ lb. <i>A. montana</i> Superintendent, Etnawalla Estate, Ambepussa, 2½ lb. <i>A. montana</i>	Superintendent, Ury Group, Badulla, 8 lb. <i>A. Fordii</i> Manager, Demodera Estate, Demodera, 8 lb. <i>A. Fordii</i>
---	--

The budded rubber in the nursery has been cut back for multiplication of budwood and is making good headway. Buddings to supplement those made last year have been made and include the following from high-yielding trees from Henaratgoda:—

Henaratgoda Plantation No. 1 Tree No. 11 Do. No. 3 Tree No. 334 Do. No. 3 Tree No. 373 Do. No. 3 Tree No. 411	Henaratgoda Plantation No. 4 Tree No. 48 Do. No. 4 Tree No. 70 Do. No. 4 Tree No. 95 Do. No. 5 Tree No. 43
--	---

The total representations of the Henaratgoda high yielders at these gardens now is therefore 172 budded stumps of 34 trees, comprising the following trees and groups:—

Plantation 1. Nos. 2, 24, 11, and 9 Do. 2. Nos. 140, 203, 85, and 249 Do. 3. Nos. 400, 401, 411, 445, 440, 439, 441, 362, 355, 373, 334, 471, 455, and 464	Plantation 4. Nos. 75, 82, 48, 71, 70, and 95. Do. 5. Nos. 47, 48 and 43 Do. 6. No. 26 Do. Progeny No. 2. Nos. 24 and 72
---	---

SOUTH GARDEN LAKE.

The improvements carried out in this area are being consolidated, but water shortage during dry weather is a considerable drawback in spite of all beds in pond being reduced in height by 2 feet. Eight new varieties of *Nymphaea Lotus* and other species were received from Kew in August last and planted out in prepared beds in the lake. These flowered well at the end of September, but the dry spell reduced the water level to such a degree that the plants had to be lifted and potted again. During this period also all the *Victoria regia* plants were burnt up, being too large to lift, as were several other water plants in the beds. Other plantings made here earlier in the year included an interesting collection of aquatic plants, chiefly *Trapa bispinosa* Roxb., *Eichhornia crassipes* Solms., *Ceratopteris thalietroides*, Brongn., *Hydrocera triflora* W and A., and *Limncharis Humboldti*. Rich., among others. Twelve mirror carp were obtained from the Nuwara Eliya Lake with the consent of the Ceylon Fishing Club and 24 young gourami were obtained from the Superintendent, Mahawatte Estate, and put in the lake. All appear to have established themselves well and no casualties have occurred to date. The fish are in fact growing splendidly, particularly the mirror carp.

GENERAL.

1. Among the many plant despatches made this year, 4 wardian cases of selected plants were sent to the Director, Royal Botanic Gardens, Kew, in April last in exchange for plants and seeds selected and brought back from England by the Curator, Royal Botanic Gardens, last year.

2. Experiments with regard to the preparation and transporting of fruit in rubber latex covers were undertaken, a crate containing 135 fruits of mangosteen being forwarded to the Secretary, Empire Marketing Board, in August last. The mangosteen season was a poor one on the whole and a portion of the fruits so treated was smaller in size than usual. The fruits were immersed in raw untreated latex and allowed to dry by suspension on string tied to the fruit stalks, 5 immersions being considered necessary to form a coat of coagulated rubber sufficient for the purpose of protecting the fruit. Three days were found sufficient for the drying out of the latex, when the fruits were then dusted with talc powder. Light canaga wood, $\frac{3}{8}$ inch thick, was used in the making of four boxes and one crate into which the fruits were then packed. The dimensions of the boxes were 15 inches by $8\frac{1}{2}$ inches by 5 inches and that of the outside crate 25 inches by 16 inches by 9 inches, the crate being slotted to allow the four boxes to be fitted in. Interspaces between the plants were arranged in both boxes and crate to allow a free circulation of air. The fruits were graded when packing, two boxes holding 32 fruits each, the third 35 fruits, and the fourth 36 fruits. The total weight when completed for despatch was 58 lb.

3. The erection of a new plant shed 45 feet by 28 feet near the stores and propagation sheds by the Public Works Department was completed during the year. The shed is of angle iron uprights with iron cross pieces and covered with wire netting, forming a closed and lock-up shed. A coir matting roof affords protection from the sun. The material obtained from the old shed was utilized in erecting a plant shed at the Economic Nursery for housing stocks of budded plants and others necessitating shelter.

4. The rubber seed season was a normal one as regards quantity, but the dry weather experienced in August adversely affected the quality and germinating power of the seed. The seeds collected and disposed of this season were Grade A 105,250, Grade B 50,000, and Grade C 341,500, the amount being credited to Government in this respect being Rs. 3,136.25, whilst free issues to replace last season's poor seed amounted to 53,500 seed.

5. Superfluous trees in Section A, where room was desired for extension of the *Ficus* collection, and on the Great Lawn, were put up for auction early in February and realized Rs. 174. The area has been cleared and the planting of additional *Ficus* done during the north-east monsoon.

6. Visits have been made at regular intervals by the Curator during the period under review to His Excellency the Governor's gardens, and the Hon. the Colonial Secretary's gardens at Colombo, Kandy, and Nuwara Eliya. Visits were also made for the purpose of advice on the laying out of the ground of the new Council Chamber, Colombo, on the relay-out and improvement of the University College grounds, Colombo, in respect to which detailed reports were submitted to the Principal, University College, the new government bungalows at Buller's road and for advice and operations in respect of the training and shaping of all roadside trees in charge of the Public Works Department on government roads in Colombo. Visits were also made to the Colombo Museum grounds, Colombo, Henaratgoda Gardens, and Davies' Tree at Katugastota at regular intervals. The Peradeniya Foreman, Mr. Ed. Perera, has also visited Hatton to advise and supervise the layout and formation of a park at Hatton.

7. His Royal Highness the Duke of Gloucester accompanied by His Excellency the Governor and their staffs visited the gardens on April 14, 1929. In commemoration of the visit a tree was planted in the Great Circle by His Royal Highness, the plant selected being a representative of the *Anonaceae*, *Monodora Tenuifolia*, the orchid flower tree, a native of tropical Africa. This species flowers profusely in the dry season, the individual flower being very suggestive of an orchid. Tea was also partaken of by the party before departure.

8. Botanical specimens for the London Matriculation Examination centres were prepared and forwarded in January and June last and those for the Cambridge Senior and Junior Examinations in December last as in previous years.

OFFICE.

Additions to and revision of the card indexing system of the gardens have been carried out. The volume of correspondence with the public, local and foreign, as well as on departmental routine, continues to be heavy, the registered letters inwards amounting to 6,269 and outward 5,864.

VISITORS.

Many distinguished visitors have visited the gardens and been conducted round during the year. The number of visitors, mostly from abroad, who signed the visitors' book at the lodge during 1929 was 3,224.

SALE OF PLANTS AND SEEDS.

The amount realized and credited to revenue for the sale of plants and seeds from Peradeniya for the calendar year, including rubber seeds from Henaratgoda Gardens and Experiment Station, Peradeniya, was Rs. 8,537.13. Of this amount Rs. 3,136.25 represented rubber seed sales. The increase on last year's total receipts of Rs. 6,392.05 is due to increased sales of rubber seed and of grafted fruit plants from Peradeniya.

The value of seeds and plants issued in exchange and free issues to government institutions, &c., amounted to Rs. 2,157.42. Value of seeds, plants, and cuttings issued free to school gardens for the calendar year amounted to Rs. 2,350.49, some 7,813 ornamental plants, grafted and seedling fruit trees having been supplied in addition to seeds and cuttings.

METEOROLOGICAL.

The following is the rainfall for the year together with the average rainfall for the past forty-six years. The heaviest rainfall in any twenty-four hours was 3.70 inches on June 24. The months of January, February, May, August, October, and December were remarkable for deficiency in rainfall whilst the remaining months much exceeded the average, the total for the year however being only 2.08 inches below the average:—

Month.	1929.		Average for 46 Years.	
	Inches.	Days.	Inches.	Days.
January	.. .70	.. 1	.. 4.02	.. 7
February	.. .42	.. 3	.. 1.84	.. 4
March	.. 6.90	.. 13	.. 4.74	.. 8
April	.. 15.78	.. 19	.. 8.18	.. 14
May	.. 3.98	.. 16	.. 6.32	.. 11
June	.. 12.54	.. 19	.. 10.28	.. 19
July	.. 8.71	.. 15	.. 8.34	.. 19
August	.. 1.42	.. 3	.. 6.42	.. 17
September	.. 8.04	.. 14	.. 6.91	.. 15
October	.. 5.91	.. 11	.. 13.29	.. 20
November	.. 18.15	.. 19	.. 10.78	.. 18
December	.. 4.85	.. 12	.. 8.31	.. 12
	87.40	145	89.43	164

HENARATGODA GARDENS.

The Assistant Curator, Henaratgoda, reports as follows:—

With the introduction of a mechanized water supply to the gardens, the general state of health of cultivated plants has been greatly improved and the inconvenience previously experienced, both by the staff and the visitors, by lack of these facilities has been reduced to a minimum.

In view of the large number of visitors and school children who visit the gardens on botanical and holiday excursions, much attention has been paid to the general improvement of lawns by eradicating termite nests and levelling down mounds and filling in depressions.

Flower Garden.—This section has been maintained in an attractive state with several uncommon specimens of orchids and other flowering plants, presenting a fine display of flower throughout the year. Those most worthy of notice are *Renanthera coccine*, *R. Maingayi*, *Rhyncostylis retusa*, *Vanda teres*, *Phaius Wallichii*, *Coelogyne asperata*, *Spathoglottis plicata* (deep purple), *S. Vieillardii* (white rosy shade with deep lilac lip), *S. plicata alba* (white), and *S. Kimballiana* (the rare yellow ground orchid with copper crimson back).

The beds of *Gerbera Jamesoni* (Babberton Daisy) has presented a fine show of vari-coloured flowers throughout the year. The plant is becoming very popular in the low country.

A row of *Casuarina equisetifolia* has been planted at the back of the lawn alongside the drive to the office with a view to trimming the trees into different shapes.

Fruit Garden.—The collection of fruit plants has been improved by the introduction of the following species:—*Psidium polycarpum*, *Anona glabra*, *Baccaurea racemosa*, *Flacourti Rukam*, *Muntingia Calabura*, and *Mindora lime*.

The grafted mango plants planted in 1924, which have attained a height of about 10 to 12 feet, have so far failed to bear fruit. With a view to encouraging fruiting, root pruning was resorted to by making deep trenches and cutting back all roots and subsequently filling in farmyard manure and humus soil.

Palmetum.—Several new introductions have been made to the collection, of which the following may be mentioned:—*Washingtoni sonorae*, *Chamaerops tomentosa*, *Oreodoxa sp.*, *Astrocaryum sp.*, *Cocos crispipathoa*, *Cocos eriopatha*, *Cocos quiquaefolia*, *Hydriastate sp.*, *Cocos compestris*, and *Livistona altissima*.

A separate group of twelve Carnuba Wax Palms of Brazil (*Copernicia cerifera*) was planted in section 6. The plants are between 12 to 18 inches high and appear to be in healthy condition. The tree is said to attain a height of about 40 feet with a trunk 6 to 8 inches thick. The young leaves are coated with wax, which is detached by shaking them. The wax is then collected together, melted and made into cakes.

Fibre Collection.—The area under fibre-yielding plants was extended and a further selection of 20 plants of 15 different named species was planted, viz., *Agave Woodrowii*, *A. filifera*, *A. Morrisii* var. *variegata*, *A. Schottii*, *A. miradorensis*, *A. rigida*, *A. Morrisii*, *A. Cubensis*, *A. salmina*, *A. gloriosa*, *A. tequilana*, *A. americana*, *Furcraea cubensis*, *Yucca gloriosa*, and *Bromelia Pinguin*.

Oil-yielding Plants suffered owing to poor soil conditions and clearly manifested the lack of plant food material in the soil. All such plants were liberally treated with humus soil buried in trenches round the plants.

Rubber Tapping.—The tapping of the three groups of Hevea, progeny No. 2 H., completed the sixth year on March 31, 1929. The same groups were put again on tapping for a further period of three years commencing from April 1, 1929.

The 100 selected high-yielding rubber trees in the six plantations completed the second period of two years' tapping on March 31, 1929. The results were published in *The Tropical Agriculturist* for October, 1929. The tapping of these trees is being continued till the completion of the third year on March 31, 1930.

Livistona Avenue.—Since the clearing of a part of the mukalana jungle bordering on both sides of the avenue for the opening of Chaulmoogra plots, the palms have suffered considerably by being exposed to strong wind and sun. The avenue which was overgrown and looked crowded was thinned by removing alternate palms.

Entada Scandens.—This handsome specimen that was trailing on an equally beautiful and stately *Canarium zeylanicum* was blown down with its host early in August by a strong gale. The site was cleared and has been utilized for the establishment of a group of *Cycadeae* and the following have been planted:—*Cycas circinalis*, *C. Rumphii*, *Dioon edule*, *Encephalartes Lehmanii*, *E. Hildebrandii*, *Macrozamia spiralis*, and *Zamia pumila*.

Labelling.—A good deal of identification of plants and labelling of important trees, &c., in addition to naming of different groups of plants was attended to.

NOTES OF BOTANICAL INTEREST.

Caryocar Nuciferum (Seuari or Butter-nut tree of British Guiana) produced profusions of large purplish brown coloured flowers during the past ten or twelve years and subsequent efforts at artificial pollination have proved futile. The flowering of the tree in April-May however has resulted in the setting of one single fruit for the first time since its introduction in 1891, the fruit being about 8 inches in circumference and of kidney shape.

Lecythis Zabucajo (Sapucaia nut of Guiana), which appears to be about thirty years old, produced a great mass of creamy white flowers on the higher branches for the first time but has not so far produced any fruit.

Tabebuia Rosea.—A handsome flowering tree of Mexico, planted in 1924, produced its pale mauve flowers in August for the first time.

Thunbergia Myosorensis.—A pretty yellow flowering climber received from Royal Botanic Gardens, Peradeniya, and *Thunbergia coccinea*, a beautiful red flowering Himalayan creeper received from Hakgala, have become established but have so far failed to flower.

Raphistemma Pulchellum.—A free flowering and easy growing climber of Burma, is producing its waxy white star-shaped blooms in clusters frequently.

Cleistanthus Collinus, *Madara*, which is reckoned and respected by the Sinhalese as one of the rarest medicinal trees of Ceylon, is growing fairly well and is about 2 feet high.

Derris Thrysiflora.—Three of these have been planted and are doing well. The roots of the plant are used for insecticidal purposes.

RECEIPTS.

	Rs	e.
Amount credited to revenue from sale of plants, &c. ..	474	20
Amount credited to revenue through E. S. P. (rubber) ..	647	45
Amount credited to revenue through R. B. G. (rubber seed) ..	2,036	25
	3,157	90
Value of free issues of plants and seeds to Government institutions, &c.	629	29

RAINFALL FOR 1929.

				Average for last 38 Years.			
		Inches.	Days.			Inches.	Days.
January	..	5.89	7	..	3.92	..	7
February	..	1.64	3	..	2.83	..	4
March	..	7.30	10	..	5.78	..	8
April	..	17.69	24	..	9.13	..	13
May	..	13.70	22	..	12.91	..	17
June	..	13.31	18	..	12.42	..	19
July	..	4.34	15	..	6.74	..	13
August	..	.51	8	..	4.43	..	10
September	..	10.26	16	..	7.47	..	14
October	..	6.81	18	..	16.34	..	19
November	..	10.45	21	..	14.29	..	16
December	..	6.76	13	..	5.93	..	9
		98.66	175		102.19		149

The greatest quantity of rainfall registered in any 24 hours was 4.93 from September 19 to 20, as against 11.20 from July 7 to 8 of the preceding year.

THE GOVERNOR'S AND COLONIAL SECRETARY'S GARDENS.

The Queen's House Garden, Colombo.—Routine operations have been kept well in hand. The tennis court screens have become dilapidated and have been removed. The pending demolition of Queen's House and the removal in the latter part of the year of His Excellency to "Temple Trees" has reduced labour requirements in respect to new works, all available labour being latterly utilized on augmenting and improving the collection of pot plants. Routine operations continue to be necessary as the gardens are still in use. A portion of the labour force has been transferred to the "Temple Trees" compound.

The King's Pavilion Garden, Kandy.—In addition to routine operations in the direction of overhauling borders and beds, pruning, manuring, &c., a scheme of improvement on a large scale has been commenced. The compound area of the staff cottage facing the Kandy Municipal offices has been taken in hand and new lawns and paths prepared. The unsightly outhouse to this cottage has now been removed by the Public Works Department and the area utilized for garden after removal of the foundation and levelling. Operations here are still in hand. Improvements on a large scale to the terraces at the back of the Pavilion were commenced in October and are now in progress. A formal garden with flights of steps, balustrades, and fountain is contemplated and the present terraces are being enlarged and shaped for the purpose. Three dozen new dahlias were purchased for the flower garden beds and groups of palms were planted on the slopes above the portion of the garden in front of the jungle path. A new Canna garden was formed on the south side of the Pavilion in June last and has furnished a fine show of colour since.

The Temple Trees Garden, Colombo.—The improvement to these gardens has continued, the predominant scheme being a fine grouping of Cannas from entrance gates to entrance porch. The herbaceous borders also have been much improved. A deal of labour is required on weed eradication on the lawns, the Cora grass and other weeds being particularly troublesome in this compound. The pot plants stocks have been much augmented lately. With the arrival of His Excellency to reside here at the latter end of the year, the cooly staff was transferred to Icicle Hall, the new residence of the Hon. the Colonial Secretary, where operations in a general overhaul and relayout of the grounds are in progress.

The Lodge Garden, Kandy.—Only one cooly is here employed and his time is mostly occupied in the necessary routine operations. All beds and borders have been overhauled, pruned, and manured and the boundaries and tennis court kept in order as far as the limited labour allows.

Queen's Cottage Garden, Nuwara Eliya.—The Curator, Hakgala, reports:—

During the early part of the year the chief work was in connection with the laying out of the area to the west of the new extension of the house. Many tons of earth were removed by the garden coolies and used for forming banks, &c., which have been turfed over. A small ornamental tank has been made at the east end of the rose garden. The lawn between the house and the garages, which was used as a dumping ground for materials, and for the erection of temporary carpenters' shops, sheds, &c., during the building of the new extension to the house, has been put into good order. Special attention has been given to the lawns during the year. All coarse grasses have been dug out and replaced with good turf and the lawns have been topdressed. The grassed area under the trees above the new tennis court, which had not been touched for some time, owing to the fact that the labour was being used for work other than general routine, was taken in hand during May and put into good order. On several occasions during the year the Head Gardener and a number of coolies were sent to King's Pavilion, Kandy, to help in the work in that garden. A small plot in the jungle to the south of the lower vegetable garden has been opened up and planted with carnations.

The laying out of the area below the Head Gardener's new quarters has been completed. The mound between the drive and the lodge has been tidied up. A large number of plants has been supplied from Hakgala during the year for planting round the ponds, &c. Another collection of rose plants has been planted out in the borders in the rose garden to fill vacancies. The area between the high bank and the new extension to the house has been laid out and a row of brick pillars built at the west end of the area and creepers planted to cover same.

The Lodge Garden, Nuwara Eliya.—This garden has been kept in good order during the year and several improvements have been carried out. The lower portion of the vegetable garden has been levelled and planted up and all the *Oxalis* infested soil removed. The grassed area between the *Cryptomeria* avenue and the clump of *Cupressus* trees has been given special attention, all depressions being filled and turfed over, and it is hoped to keep this area regularly mown in future. The area under the *Cupressus* trees mentioned above has been tidied up. All the beds and borders were well manured and planted up towards the end of the year and give promise of a good show of flowers during the season.

Peradeniya, January 18, 1930.

T. H. PARSONS,
Curator, Royal Botanic Gardens.

BOTANIC GARDENS, HAKGALA, REPORT FOR 1929.

AREA NEAR ENTRANCE GATES.

Considerable improvements have been carried out in the area near the entrance gates during the year. The building of the two retaining walls throughout the length of the *Cupressus* avenue and on to the culvert outside the gates has been completed. *Saxifraga Sarmentosa* and *Anthericum variegatum* have been planted between the stones of the upper and lower retaining walls, respectively, and *Euphorbia splendens* along the ledge between.

The inner edge of the drive has been paved with stones, and the small border so formed has been planted up with *Scutellaria oblonga* which is so useful a subject for edgings, &c.

The path above the *Cupressus* avenue has been considerably altered and the area between this path and the avenue has been suitably sloped and planted up with *Paspalum dilatatum*.

Five plants of *Araucaria imbricata*, the Chilean Pine or Monkey Puzzle, have been planted out on the bank immediately above the entrance gates. These plants were raised from seed received from Mrs. Rollo, Nuwara Eliya.

The bank above the two retaining walls outside the gates is at present being sloped and is to be planted up with a collection of selected flowering shrubs and grassed over with *Paspalum dilatatum*. Several trees of *Loranthus*-infested *Acacia decurrens* have been removed from this slope.

The lower branches of the trees in the avenue have been lopped and all dead branches removed.

The barbed wire fence along the top of the bank above the gates has been renewed.

A drain, 100 yards long, 18 inches deep, and 18 inches wide, has been opened up through the patana above this area to prevent wash. Before this drain was made, considerable damage was done by wash during heavy rains. The retaining wall of the drive immediately inside the gates has been rebuilt. A new flight of steps has been built to connect the path leading down from the nursery and the new path above the avenue, and the sides of this path throughout its length have been paved. The sides of the flight of steps leading to the new path from the drive near gates have been rebuilt. The culvert under the main road outside the entrance gates has been extended 7 feet by the Public Works Department and metalled over, and it is now possible for large cars to turn into the gardens without reversing.

The circle outside the gates has been slightly widened and the drain running round same has been rebuilt and put in good order.

Nine brick pillars, plastered over with lime and broken limestones, to match the main pillars of the gates, and connected with double chains, have been built along the outer edge of the drive between the gates and the end of the *Cupressus* avenue.

ROCK GARDEN.

This garden has been kept in good order throughout the year, but I regret to report that considerable damage continues to be done by sambur, wild pig, and porcupines. During the last three months of the year, sambur and wild pig visited the garden on forty-three occasions.

The whole garden was overhauled during September-November when a good deal of replanting was done.

All the ponds which had silted up have been cleaned out and the *Nymphaeas* kept in check.

A few plants of new varieties of *Hydrangea*, brought out from England by the Curator, Royal Botanic Gardens, Peradeniya, have been planted out and are growing well.

The large bed of succulents in the centre of the lawn near the summer arbour has been done away with and turfed over, and another bed of these plants has been established at the north-west end of the lawn.

The underground drains under the lawn near the main entrance have been put into good order.

BULB GARDEN.

There has been a good show of flowers in this garden during the twelve months and the following, which have become well established, have proved their worth:—*Cyrtanthus intermedius* C. Mackenii; *Hemerocallis aurantiaca*, *H. fulva*; *Lilium longiflorum*; *Watsonia densiflora alba*, *W. d. rosea*, *W. Meriana*, *W. Meriana O'Brieni*; *Hippeastrum equestre*; *Tigridia pavonia* vars.; *Knifofia*; *Dahlias*; *Cannas*; *Morea bicolor*; *Agapanthus*, &c.

A collection of daffodils, received from Messrs. Sutton & Sons, Reading, England, in exchange for seeds, flowered well.

The 20-lb. mirror carp in the upper pond has been transferred to the pond in this garden as there was danger of its being killed by otters. New gates have been made for closing the two entrances during the night, as a protection against sambur, wild pig, porcupines, and others. The garden was given a general overhaul during November when it was manured and planted. The creepers round the garden have been thinned and others have been planted.

FRUIT PLOTS.

These have been kept in good order, but owing to their exposed position considerable damage is done to the plants during the south-west monsoon, and they do not make much progress.

The grapefruit plants put out in 1925 have made fair growth but have not yet flowered. To grow fruit successfully at Hakgala, the opening up of a new plot is very necessary.

GREENHOUSE.

The greenhouse has been removed from the upper Flower Garden and re-erected on the newly levelled site to the south of the stores. The dismantling and re-erecting of the house was successfully carried out by the gardens carpenter, and, with the exception of glass panes for one side of the house, all the old materials were used.

Piping for a separate water supply to the house has been laid from a spring near the old tea plot. The greater portion of the area round the house has been levelled, and it is hoped that the pits and orchid house will be moved to this site as soon as possible.

The following flowering creepers have been received from Peradeniya and planted out in the house:—*Ipomoea Briggsii*, *Antigonon leptopus*, *Bignonia venusta*, *Thunbergia grandiflora*, *Aristolochia gigas*, and *Thunbergia Mysorensis*.

The centre stage in the northern half of the house has been devoted to *Spathoglottis* sp. received from Mr. A. M. MacNeill, Kirrimittia Estate, Kadugannawa, and these are doing very well.

A row of *Cupressus* has been planted round the area to form a hedge.

PLANTING.

The following entry number plants have been put out during the year:—2 *Cinnamomum Camphora* (solid camphor yielding) from Mauritius; 19 *Araucaria imbricata*, 2 *Cupressus sempervirens* var. *fastigiata*, 2 *Templetonia retusa*, 5 *Acacia floribunda*, 2 *Acacia longifolia*, 2 *Acacia iteaphylla*, 1 *A. fimbriata*, 1 *A. myrtifolia*, 1 *Grevillea Hilliana*, 1 *Swainsonia coronillifolia*, 1 *Callistemon paludosus*, 1 *Callistachys ovata*, 1 *Araucaria excelsa*, 5 *Cupressus lusitanica*, and 2 *Cryptomeria glabra*.

CINCHONA.

During the year the following *Cinchona* plants have been distributed to the Experiment Station, Peradeniya, and to level estates:—577 *Cinchona robusta* and 265 *Cinchona Ledgeriana*.

A small plot near the oak plantation is to be planted up with *Cinchona robusta* as soon as possible, as this species gives promise to do well at this elevation.

BUILDINGS.

A new lavatory for the use of visitors has been built by the Public Works Department below the Nock Memorial, to take the place of the old lavatory which was in a very dilapidated condition.

The older part of the Curator's bungalow has been rebuilt during the early part of the year. The work was completed in six months and during this time the Curator occupied the laboratory bungalow. The cement drains round the laboratory have been extended to the open drain below the bank in front of the building.

The Tamil cooly lines have been demolished and a new set of 16 rooms built by the Public Works Department, 12 rooms being built on the old site and 4 on the bank above.

GENERAL.

The site in the upper Flower Garden on which the greenhouse stood has been levelled and laid out.

In the centre of this area an ornamental tank has been made and the following water plants have been planted in tubs in same:—*Nymphaea Mexicana*, *N. stellata*, *Aponogeton distachyum* and *A. crispum*. The banks round this area have been resloped and turfed with *Paspalum dilatatum* and *Panicum repens*.

The weeding out of *Aristoea eckloni*, which has become a very troublesome weed, has been continued during the year.

Considerable damage continues to be done in all parts of the gardens by sambur, wild pig, and porcupines and funds for the erection of a good boundary fence are urgently needed.

There has been a good demand for conifer plants during the year and over 2,400 plants of these have been sent out from the nursery.

All the beds and borders were dug, manured, and planted during the latter part of the year, and all drives, paths, and drains have been kept in good order.

A large number of seedlings of *Eucalyptus*, *Acacia*, &c., have been raised from seeds received from the Chairman, Board of Improvement, Nuwara Eliya, for planting in Nuwara Eliya.

During the year the following gardens, &c., have been visited by the Curator and advice given with regard to the laying out and planting of same:—The Hill Club, Nuwara Eliya; the Bank Bungalow, Nuwara Eliya; Broomfield, Nuwara Eliya; Glenorchy Estate, Ambawela; Warwick Estate, Ambawela; Oakley, Nuwara Eliya; R. A. Camp, Diyatalawa.

Loranthus parasite on the trees in the lower oak plot has been removed and the plot tidied up.

An extension to the Curator's office has been built by the Public Works Department and a trellis work screen erected to divide the office from the bungalow.

Clumps of Arum lilies were planted out in the swampy parts of the area near the laboratory early in the year, but as soon as they had become established practically all the plants were destroyed by porcupines.

INTRODUCTIONS.

Plants and seeds have been received from the following:—The Botanic Station, Brignoles, France; Mrs. Edith Coleman, Walshaw, Blackburn, Victoria, Australia; Messrs. Sutton & Sons, Reading, England; the Lloyd Botanic Gardens, Darjeeling; Mr. P. J. Wester, Philippines; the Director, Royal Botanic Gardens, Kew; the Director, Bureau of Plant Industry, U. S. A. Department of Agriculture, Washington; the Director of Agriculture, Tanganyika; the Director of Agriculture, Dehra Dun; and Mr. McDoudall, Logan, Port Logan, Wigtownshire, Scotland.

And from the following in the Island:—The Systematic Botanist, Peradeniya; Mrs. Cotton, Tredorne, Ambawela; the Curator, Royal Botanic Gardens, Peradeniya; Mrs. Kindersley, Kandy; the Manager, Publication Depot and Seed Store, Peradeniya; the Chairman, Board of Improvement, Nuwara Eliya; Miss Tilly, Galkandawatta, Talawakele.

REVENUE.

The amount realized by sales of plants and seeds for the twelve months ended December 31 was Rs. 1,519.95, and for the twelve months ended September 30 was Rs. 1,446.12.

The value of plants and seeds issued gratis or in exchange to Government institutions was Rs. 635 for the twelve months ended December 31.

METEOROLOGICAL.

The number of inches of rain recorded during the year was 86.42 falling on 214 days, compared to 93.58 falling on 219 days during 1928.

The wettest month was December with 17.10 inches, and the driest January with 1.05 inches.

The highest temperature in the sun's rays was 155.6 on September 15, compared to 151.4 on December 20 of the previous year.

The highest temperature in the shade was 80.4 on May 15, compared to 81.0 on April 20 of the previous year.

The lowest temperature on the grass was 32.2 on January 5, compared to 33.3 on February 17 of the previous year.

JAMES NOCK,
Curator.

NUWARA ELIAYA GARDEN, REPORT FOR 1929.

DURING the early part of the year severe frosts did considerable damage to shrubs, &c., many of which had not been previously affected.

The poor specimens of *Cupressus Lawsoniana* on the mound to the north of the Memorial have been rooted out and the mound levelled and turfed over.

The weeding out of *Sporozolus indicus* and *Anaphalis brevifolia* from the lawns has been continued during the year.

The four large beds on the lawn below the plant sheds have been planted up with carnations and the rose borders have been well dug and manured.

The footpath along the main road between the Memorial and the Post Office has been moved further in towards the park and the fence along same has been re-erected.

Seeds of various kinds of trees and shrubs, imported from Australia, have been sown and also seeds of swamp plants from England.

The garden has been kept in good order during the year.

The funds allowed for the garden by the Department of Agriculture have been discontinued as from October 1, 1929, and the garden has been taken over by the Board of Improvement.

JAMES NOCK,
Curator.

